

UNITED STATES OF AMERICA  
DEPARTMENT OF TRANSPORTATION - FEDERAL AVIATION ADMINISTRATION  
**SPECIAL AIRWORTHINESS CERTIFICATE**

<b>A</b>	CATEGORY/DESIGNATION <del>EXPERIMENTAL</del> (UNMANNED AIRCRAFT)	
	PURPOSE Research & Development, Mkt. Survey, Crew Training	
<b>B</b>	MANUFACTURER	NAME N/A
		ADDRESS N/A
<b>C</b>	FLIGHT	FROM N/A
		TO N/A
<b>D</b>	N-827AU	SERIAL NO. AU-027
	BUILDER Aurora Flight Sciences	MODEL GE-50
<b>E</b>	DATE OF ISSUANCE January 29, 2009	EXPIRY January 28, 2010
	OPERATING LIMITATIONS DATED 01/29/09	ARE PART OF THIS CERTIFICATE
	SIGNATURE OF FAA REPRESENTATIVE	DESIGNATION OR OFFICE NO.
	Henry K. Cooper	ANE-MIDO-44

Any alteration, reproduction or misuse of this certificate may be punishable by a fine not exceeding \$1,000 or imprisonment not exceeding 3 years, or both. THIS CERTIFICATE MUST BE DISPLAYED IN THE AIRCRAFT IN ACCORDANCE WITH APPLICABLE TITLE 14, CODE OF FEDERAL REGULATIONS (CFR).

A	This airworthiness certificate is issued under the authority of Public Law 104-6, 49 United States Code (USC) 44704 and Title 14 Code of Federal Regulations (CFR).
B	The airworthiness certificate authorizes the manufacturer named on the reverse side to conduct production flight tests, and only production flight tests, of aircraft registered in his name. No person may conduct production flight tests under this certificate: (1) Carrying persons or property for compensation or hire; and/or (2) Carrying persons not essential to the purpose of the flight.
C	This airworthiness certificate authorizes the flight specified on the reverse side for the purpose shown in Block A.
D	This airworthiness certificate certifies that as of the date of issuance, the aircraft to which issued has been inspected and found to meet the requirements of the applicable CFR. The aircraft does not meet the requirements of the applicable comprehensive and detailed airworthiness code as provided by Annex 8 to the Convention On International Civil Aviation. No person may operate the aircraft described on the reverse side: (1) except in accordance with the applicable CFR and in accordance with conditions and limitations which may be prescribed by the Administrator as part of this certificate; (2) over any foreign country without the special permission of that country.
E	Unless sooner surrendered, suspended, or revoked, this airworthiness certificate is effective for the duration and under the conditions prescribed in 14 CFR, Part 21, Section 21.181 or 21.217.



New Cumberland Manufacturing Inspection District Office  
Bldg. 201, Room 102, 400 Airport Drive  
New Cumberland, PA 17070-3419

CANCELLED

**Operating Limitations**  
**Experimental: Research and Development, Market Survey,**  
**and/or Crew Training**

<b>Registered Owner Name:</b> AURORA FLIGHT SCIENCES	<b>Aircraft Builder:</b> AURORA FLIGHT SCIENCES
<b>Registered Owner Address:</b> 9950 Wakemann Drive Manassas, VA 20110	<b>Year Manufactured:</b> 2006
<b>Aircraft Description:</b> Ducted Fan Vertical Take-Off and Landing	<b>Aircraft Serial Number:</b> AU-027
<b>Aircraft Registration:</b> N827AU	<b>Aircraft Model Designation:</b> GoldenEye 50 (GE-50)
	<b>Engine Model:</b> Desert Aircraft DA-50-R

**The following conditions and limitations apply to all unmanned aircraft system (UAS) flight operations for the Aurora GE-50 while operating in the National Airspace System (NAS).**

**1. General Information.**

**a. Integrated system.** For the purposes of this special airworthiness certificate and operating limitations, the GE-50 operated by Aurora Flight Sciences is considered to be an integrated system. The system is composed of the following:

- (1) Aurora GE-50, serial number: AU-027.
- (2) UAS control station(s), that is, fixed, mobile, ground-based, or airborne.
- (3) Telemetry, launch, and recovery equipment.
- (4) Communications and navigation equipment, including ground and/or air equipment used for command and control of the Aurora GE-50.



(5) Equipment on the ground and in the air used for communication with the chase aircraft, other members of the flight crew, observers, air traffic control (ATC), and other users of the NAS.

**b. Compliance with 14 CFR part 61 (Certification: Pilots, Flight Instructors, and Ground Instructors) and part 91 (General Operating and Flight Rules).** Unless otherwise specified in this document, the UA pilot-in-command (PIC) and Aurora Flight Sciences must comply with all applicable sections and parts of 14 CFR including, but not limited to, parts 61 and 91.

**c. Operational requirements.**

(1) No person may operate this UAS for other than the purpose of research and development, market survey, and/or crew training, to accomplish the flight operation outlined in Aurora Flight Sciences program letter dated 01/12/09, which describes compliance with § 21.193(d), Experimental certificates: General, and has been made available to the UA PIC.

(2) This UAS must be operated in accordance with applicable air traffic and general operating rules of part 91 and all additional limitations herein prescribed under the provisions of § 91.319(i), Aircraft having experimental certificates: Operating limitations.

(3) Aurora Flight Sciences must accumulate at least 50 flight hours under its experimental airworthiness certificate before customer crew training is permitted, in accordance with § 21.195(d), Experimental certificates: Aircraft to be used for market surveys, sales demonstrations, and customer crew training.

**d. UA condition.** The UA PIC must determine that the UA is in a condition for safe operation and in a configuration appropriate for the purpose of the intended flight.

**e. Multiple-purpose operations.** When changing between operating purposes of a multiple purpose certificate, the operator must determine that the aircraft is in a condition for safe operation and appropriate for the purpose intended. A record entry will be made by an appropriately rated person (that is, an individual authorized by the applicant and acceptable to the FAA) to document that finding in the maintenance records.

**f. Operation exceptions.** No person may operate this UA to carry property for compensation or hire (§ 91.319(a)(2)).

**g. UA markings.**

(1) This UA must be marked with its U.S. registration number in accordance with part 45 or alternative marking approval issued by the FAA Production and Airworthiness Division (AIR-200).

(2) This UA must display the word *Experimental* in accordance with § 45.23(b), Display of marks, unless otherwise granted an exemption from this requirement.

**h. Required documentation.** Before conducting the initial flight of the GE-50, Aurora Flight Sciences, must forward a copy of the GE-50 program letter, special airworthiness certificate, and operating limitations to the following personnel:

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(1) Peter Acevedo, FAA Air Traffic Representative, Eastern Service Center, System Support, 1701 Columbia Ave, College Park, GA 30337, telephone (404) 305-5598, email [peter.k.acevedo@faa.gov](mailto:peter.k.acevedo@faa.gov).

(2) Richard Posey, Aviation Safety Inspector, Production and Airworthiness Division, AIR-200, 800 Independence Ave, SW, Washington, DC 20591, telephone (202) 267-9538, email [richard.posey@faa.gov](mailto:richard.posey@faa.gov).

**i. Change in registrant address.** Section 47.45, Change of address, requires that the FAA Aircraft Registry be notified within 30 days of any change in the aircraft registrant's address. Such notification is to be made by providing AC Form 8050-1, Aircraft Registration Application, to the FAA Aircraft Registration Branch (AFS-750) in Oklahoma City, Oklahoma.

**j. Certificate display and manual availability.** The airworthiness and registration certificates must be displayed, and the aircraft flight manual must be available to the pilot, as prescribed by the applicable sections of 14 CFR, or as prescribed by an exemption granted in accordance with 14 CFR part 11, General Rulemaking Procedures to Aurora Flight Sciences.

**2. Program Letter.** The Aurora Flight Sciences GE-50 program letter, dated 01/12/09, will be used as a basis for determining the operating limitations prescribed in this document. All flight operations must be conducted in accordance with the provisions of this document.

### **3. Authorized Flight Operations Area.**

**a. Description of the authorized flight operations area.** The base of operations for the UA shall be:

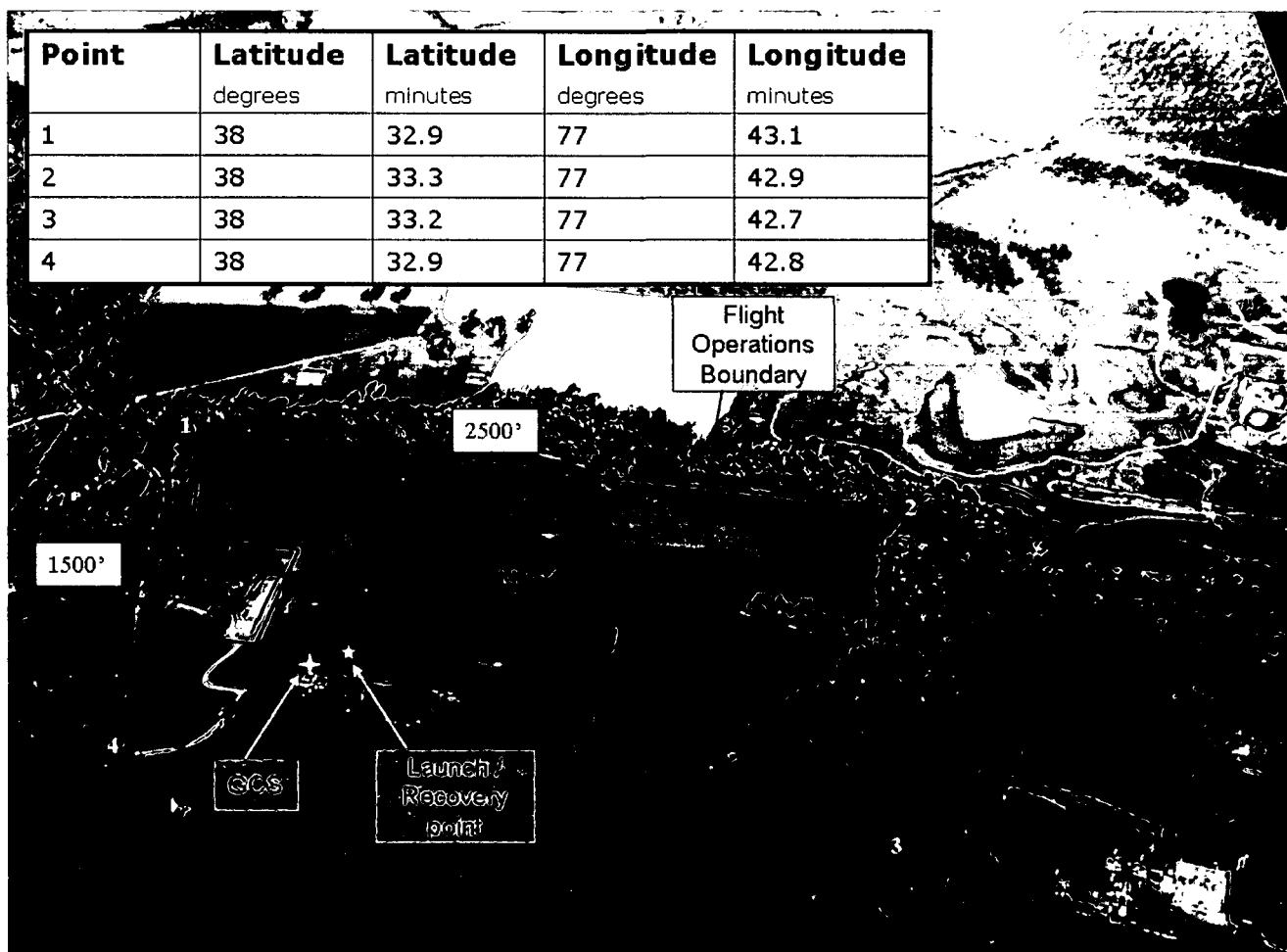
Flying Circus Aerodrome (3VA3)  
5414 Ritchie Rd  
Bealeton, VA 22712

**b. Flight test area.** The flight test operations area authorized for the UA at Flying Circus Aerodrome (3VA3) is graphically depicted below. No flights shall exceed 400 feet AGL.

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**c. Authorized flight times and conditions.** All flight operations must be conducted during daylight hours under visual flight rules (VFR).

**d. Notification.** Aurora shall notify the airport manager/owner, prior each operation, for coordination with any other potential activity in the vicinity.

**e. Criteria for remaining in the flight test area.** The UAS PIC must ensure all UA flight operations remain within the lateral and vertical boundaries of the flight test area. Furthermore, the UAS PIC must take into account all factors that may affect the capability of the UA to remain within the flight test area. This includes, but is not limited to, considerations for wind, gross weight, and glide distances.

**f. Incident/accident reporting.** Any incident/accident and any flight operation that transgresses the lateral or vertical boundaries of the flight test area or any restricted airspace must be reported to the FAA within 24 hours. This information must be reported to the Unmanned Aircraft Program Office, AIR-160. AIR-160 can be reached by telephone at 202-385-4636 and fax at 202-385-4651. Accidents must be reported to the National Transportation Safety Board (NTSB) per instructions contained on the NTSB Web site: [www.nts.gov](http://www.nts.gov). Further flight operations must not be conducted until the incident is

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reviewed by AIR-160 and authorization to resume operations is provided to Aurora Flight Sciences.

#### **4. UA Pilots and Observers.**

##### **a. UA PIC roles and responsibilities.**

- (1) The UA PIC must perform crew duties for only one UA at a time.
- (2) All flight operations must have a designated UA PIC. The UA PIC has responsibility over each flight conducted and is accountable for the UA flight operation.
- (3) The UA PIC is responsible for the safety of the UA as well as persons and property along the UA flight path. This includes, but is not limited to, collision avoidance and the safety of persons and property in the air and on the ground.
- (4) The UA PIC must avoid densely populated areas (§ 91.319) and exercise increased vigilance when operating within or in the vicinity of published airway boundaries.

##### **b. UA PIC certification and ratings requirements.**

- (1) The UA PIC must hold and be in possession of, at a minimum, an FAA private pilot certificate, with either an airplane, rotorcraft, or powered-lift category; and single- or multiengine class ratings, appropriate to the type of UA being operated.
- (2) The UA PIC must have and be in possession of a valid second-class (or higher) airman medical certificate issued under 14 CFR part 67, Medical Standards and Certification.

##### **c. UA PIC currency, flight review, and training.**

- (1) No person may act as pilot in command of an unmanned aircraft unless that person has made at least three takeoffs and three landings in manned aircraft within the preceding 90 days acting as the sole manipulator of the flight controls.
- (2) The UA PIC must have a flight review in manned aircraft every 24 calendar months in accordance with § 61.56, Flight review.
- (3) The UA PIC must maintain currency in unmanned aircraft in accordance with Aurora Flight Sciences company procedures.
- (4) The UA PIC must have a flight review in unmanned aircraft every 24 calendar months in accordance with Aurora Flight Sciences procedures.
- (5) All UA PIC's must have successfully completed applicable Aurora Flight Sciences training for the UAS.

##### **d. Supplemental UA pilot roles and responsibilities.**

- (1) Any additional UA pilot(s) assigned to a crew station during UA flight operations will be considered a supplemental UA pilot.
- (2) A supplemental UA pilot assists the PIC in the operation of the UA and may do so at the same or a different control station as the PIC. The UA PIC will have operational override capability over any supplemental UA pilots, regardless of position.
- (3) A supplemental UA pilot must perform crew duties for only one UA at a time.



**e. Supplemental UA pilot certification.** The supplemental UA PIC need not be a certificated pilot, but must have successfully completed a recognized private pilot ground school program.

**f. Supplemental UA pilot currency, flight review, and training.**

(1) All UA pilots must maintain currency in unmanned aircraft in accordance with Aurora Flight Sciences company procedures.

(2) All UA pilots must have a flight review in unmanned aircraft every 24 calendar months in accordance with Aurora Flight Sciences procedures.

(3) All UA pilots must have successfully completed applicable Aurora Flight Sciences training for the UAS.

**g. Observer roles and responsibilities.** The task of the observer is to provide the UA PIC(s) with instructions to maneuver the UA clear of any potential collision with other traffic. To satisfy these requirements:

(1) The observer must perform crew duties for only one UA at a time.

(2) At no time will the observer permit the UA to operate beyond the line-of-sight necessary to ensure maneuvering information can be reliably determined.

(3) At no time will the observer conduct his/her duties more than 1300 feet laterally or 400 feet vertically from the UA.

(4) An observer must maintain continuous visual contact with the UA to discern UA attitude and trajectory in relation to conflicting traffic.

(5) An observer may be positioned in a chase aircraft. When a chase aircraft is used, it must maintain a reasonable proximity, and must position itself relative to the UA to reduce the hazard of collision in accordance with § 91.111, Operating near other aircraft. When the observer is located in a chase aircraft, the observer's duties must be dedicated to the task of observation only. Concurrent duty as pilot of the chase aircraft is not authorized.

(6) Observers must continually scan the airspace for other aircraft that pose a potential conflict.

(7) All flight operations conducted in the flight test area must have an observer to perform traffic avoidance and visual observation to fulfill the see-and-avoid requirement of § 91.113, Right-of-way rules: Except water operations.

**h. Observer certification.**

(1) All observers must either hold, at a minimum, an FAA private pilot license or military equivalent, or must have successfully completed specific observer training acceptable to the FAA. An observer does not require currency as a pilot.

(2) All observers must have in their possession a valid second-class (or higher) airman medical certificate issued under part 67.

**i. Observer training.**

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(1) All observers must be thoroughly trained, be familiar with, and possess operational experience with the equipment being used. Such training is necessary for observation and detection of other aircraft for collision avoidance purposes as outlined in Aurora Flight Sciences program letter.

(2) All observers must have successfully completed applicable Aurora Flight Sciences training for the UAS.

**5. Equipage.** The GE-50 Ground Control Station shall be equipped with two-way communications equipment allowing for communications between the UA pilot and Air Traffic Control.

**6. Communications.**

**a. Before UA flights.** Before conducting operations, the frequency spectrum used for operation and control of the UA must be approved by the Federal Communications Commission or other appropriate government oversight agency.

**b. During UA flights.**

(1) Appropriate air traffic frequencies must be monitored during flight operations.

(2) All UA positions must maintain two-way communications with each other during all operations. If unable to maintain two-way communication, the UA PIC will expeditiously return the UA to its base of operations while remaining within the flight test area and conclude the flight operation.

**7. Flight Conditions.**

**a. Daylight operations.** All flight operations must be conducted during daylight hours in visual meteorological conditions (VMC), including cloud clearance minimums as specified in § 91.155, Basic VFR weather minimums. Flight operation in instrument meteorological conditions (IMC) is not permitted.

**b. Prohibitions.**

(1) The UA is prohibited from aerobatic flight, that is, an intentional maneuver involving an abrupt change in the UA's attitude, an abnormal acceleration, or other flight action not necessary for normal flight. (See § 91.303, Aerobatic flight.) If aerobatic flight is anticipated, it must be thoroughly discussed during the system review and be appropriately described in the operating limitations.

(2) Flight operations must not involve carrying hazardous material or the dropping of any objects or external stores.

(3) Each UA must be operated by only one control station at a time. A control station may not be used to operate multiple UAS.

**c. Notice to airman.** Aurora Flight Sciences must request the issuance of a Notice to Airman (NOTAM) through the local Automated Flight Service Station at least 24 hours before flight operation.

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## 8. Flight Termination and Lost Link Procedures.

**a. Flight termination.** In accordance with Aurora Flight Sciences program letter, dated 01/12/09, flight termination must be initiated at any point that safe operation of the UA cannot be maintained or if hazard to persons or property is imminent.

**b. Lost link procedures.** In the event of lost link, the UA must provide a means of automatic recovery that ensures airborne operations are predictable and that the UA remains within the flight test area. The chase aircraft or observer, all other UAS control stations, and the appropriate ATC facility will be immediately notified of the lost link condition and the expected UA response.

## 9. Maintenance and Inspection.

**a. General requirements.** The UAS must not be operated unless it is inspected and maintained in accordance with the GE-50 Preflight Inspection report AR07-069A, and the GE-50 Postflight Inspection report AR07-070A, both dated July 26, 2007, or later accepted FAA revision. Aurora Flight Sciences must establish and maintain aircraft maintenance records (see paragraph 10(d) below).

**b. Inspections.** No person may operate this UAS within the preceding 12 calendar months unless it has had a condition inspection performed according to the FAA-accepted Aurora Flight Sciences GE-50 Preflight Inspection report AR07-069A, and the GE-50 Postflight Inspection report AR07-070A, both dated July 26, 2007, and was found to be in a condition for safe operation. This inspection will be recorded in the UAS maintenance records as described in paragraph 10(d) below.

**c. Authorized inspectors.** Only those individuals trained and authorized by Aurora Flight Sciences and acceptable to the FAA may perform the inspections and maintenance required by these operating limitations.

**d. Maintenance and inspection records.** Maintenance and inspections of the UAS must be recorded in the UAS maintenance records. The following information must be recorded:

(1) Maintenance record entries must include a description of the work performed, the date of completion for the work, the UAS's total time-in-service, and the name and signature of the person performing the work.

(2) Inspection entries must contain the following, or a similarly worded, statement: *I certify that this UAS was inspected on (date), in accordance with the scope and detail of the (applicant name) Inspection and Maintenance Program, and was found to be in a condition for safe operation.*

(3) UAS instruments and equipment required to be installed must be inspected and maintained in accordance with the requirements of the Aurora Flight Sciences FAA-accepted Aurora Flight Sciences GE-50 Preflight Inspection report AR07-069A, and the GE-50 Postflight Inspection report AR07-070A, both dated July 26, 2007. Any maintenance or inspection of this equipment must be recorded in the UAS maintenance records.

**10. Information Reporting.** Aurora Flight Sciences shall provide the following information to Donald E Grampp@faa.gov, and AIR-200 on a monthly basis:



- a. Number of flights conducted under this certificate.
- b. Pilot duty time per flight.
- c. Unusual equipment malfunctions (hardware or software).
- d. Deviations from ATC instructions.
- e. Unintended entry into lost link flight mode that results in a course change.

## 11. Revisions and Other Provisions.

**a. Experimental certificates, program letters, and operating limitations.** The experimental certificate, FAA-accepted Aurora Flight Sciences program letter, and operating limitations cannot be reissued, renewed, or revised without application being made to the New Cumberland Manufacturing Inspection District Office (MIDO), in coordination with AIR-200. AIR-200 will be responsible for FAA Headquarters internal coordination with the Aircraft Certification Service, Flight Standards Service, Air Traffic Organization, Office of the Chief Council, and Office of Rulemaking.

**b. Certificates of waiver or authorization.** Aurora Flight Sciences shall immediately notify the Production and Airworthiness Division, AIR-200, and the New Cumberland MIDO, if there is any plan for requesting a Certificate of Authorization or Waiver (COA) for UAS operations during the time the experimental certificate is in effect. An entry in the aircraft logbook is required to document that the aircraft flight authority has been changed from the experimental certificate to COA. When COA operations are concluded and the aircraft resumes flying under the experimental certificate, a record entry will be made in the aircraft logbook by an appropriately rated person to document that the aircraft is in a condition for safe operation and appropriately configured.

**c. Amendments and cancellations.** The provisions and limitations annotated in this operational approval may be amended or cancelled at any time as deemed necessary by the FAA.

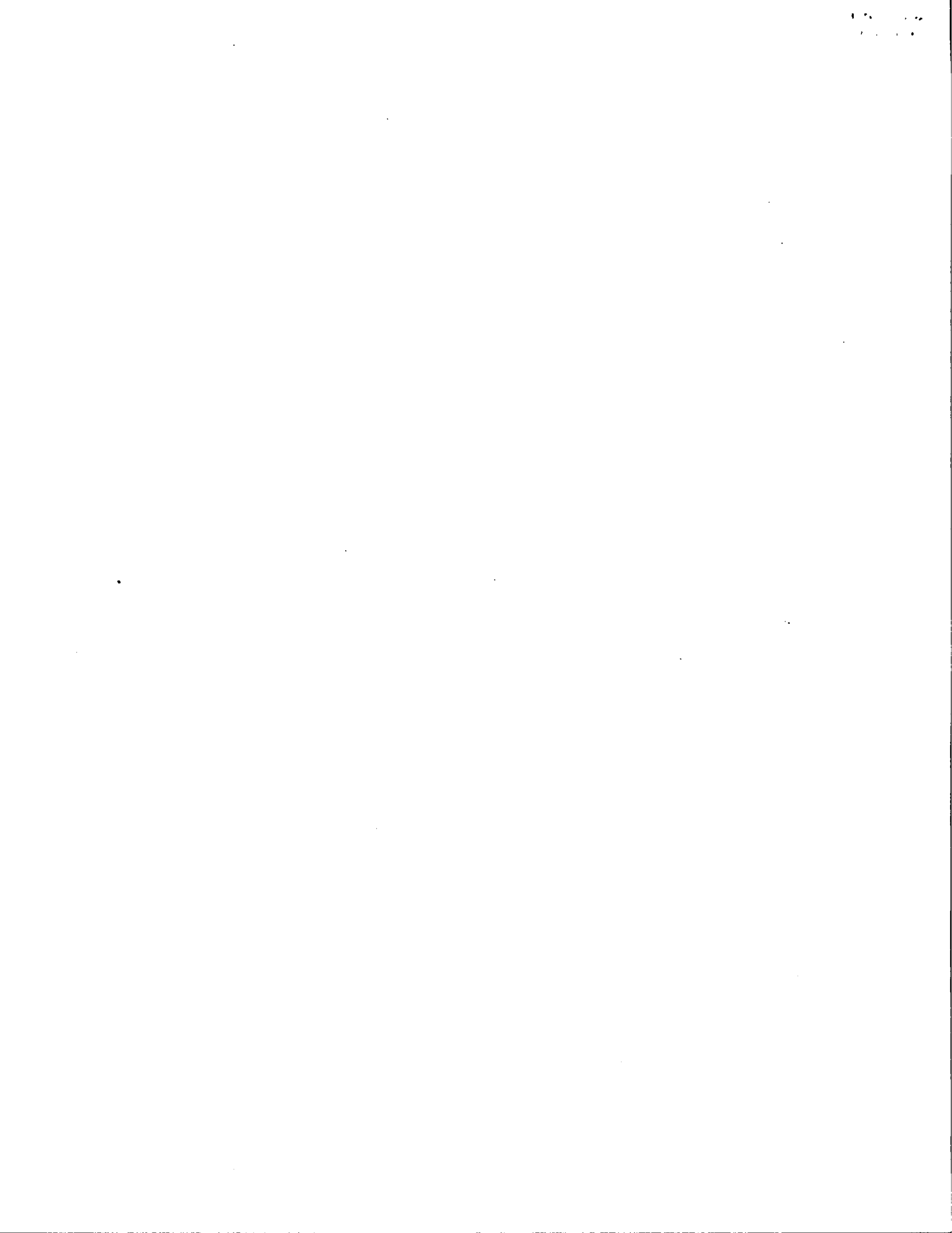
**d. Reviews of revisions.** All revisions to Aurora FAA-accepted GE-50 Preflight Inspection report AR07-069A, and the GE-50 Postflight Inspection report AR07-070A both dated July 26, 2007, or later FAA-accepted revision must be reviewed and accepted by the Washington Flight Standards District Office.

## 12. UAS Modifications.

**a. Software and system changes.** All software and system changes will be documented as part of the normal maintenance procedures and will be available for inspection. All software and system changes shall be inspected and approved per Aurora's maintenance procedures. All software changes to the aircraft and control station are categorized as major changes, and must be provided in summary form at the time they are incorporated.

**b. Major modifications.** All major modifications, whether performed under the experimental certificate, COA, or other authorizations, that could potentially affect the safe operation of the system, must be documented and provided to the FAA before operating the aircraft under this certificate. Major modifications incorporated under COA or other

CANCELLED



authorization needs to be provided only if the aircraft is flown under these authorizations during the effective period of the experimental certificate.

**c. Submission of modifications.** All information requested must be provided to AIR-200.

End of Limitations



Henry K. Cooper  
Aviation Safety Inspector  
New Cumberland Manufacturing Inspection District  
Office Bldg. 201, Room 102, 400 Airport Drive  
New Cumberland, PA 17070-3419

Date:

1/29/09

I certify that I have read and understand the operating limitations and conditions that are a part of the special airworthiness certificate, FAA Form 8130-7, issued on January 29, 2009, for the purposes of research and development, market survey, and/or crew training.

This special airworthiness certificate is issued for Aurora Flight Sciences GE-50, serial number AU-027, registration number N827AU.



Applicant (signature)

Date:

1/29/09

Name: Peter Cooke

Title: GoldenEye 50 Chief Engineer

Company: Aurora Flight Sciences

CANCELLED





Date: 12 Oct 2010

Mr Henry K. Cooper  
Senior Aviation Safety Inspector  
Manufacturing Inspection District Office -44  
400 Airport Drive, Bldg. 201, Rm. 102  
New Cumberland, PA 17070-3419

Dear Mr Cooper,

In response to your letter dated October 4, 2010 regarding the status of GoldenEye 50 UAS Experimental Airworthiness Certificates, Aurora Flight Sciences will not be renewing these certificates at this time. As such, the requested FAA Form 8130-7 and operating limitations for the aircraft in question are enclosed.

Please contact me if you have any questions regarding this or any of our other UAS activities.

Sincerely,

A handwritten signature in black ink, appearing to read "Thomas Washington".

Thomas Washington  
Director of UAS Operations  
Aurora Flight Sciences  
(703) 530 – 1953  
(571) 229 – 2285  
[twashington@aurora.aero](mailto:twashington@aurora.aero)

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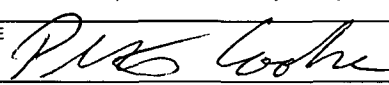
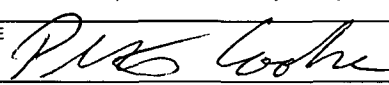
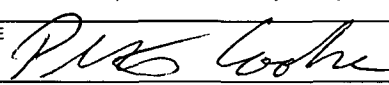
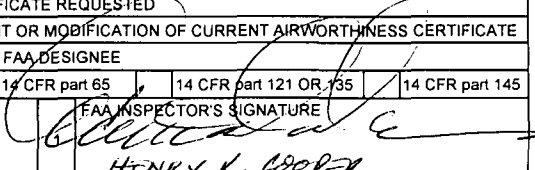
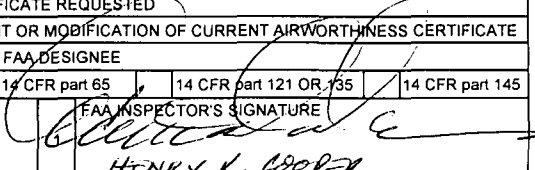
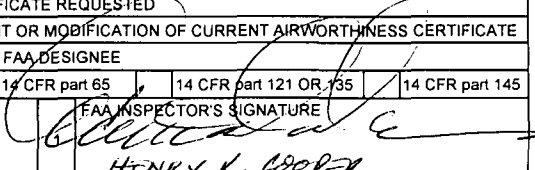
10/18/2010



## FAA FORM 8130-6, APPLICATION FOR U.S. AIRWORTHINESS CERTIFICATE

Form Approved O.M.B. No. 2120-0018  
12/31/2010

Accepted NV Apr/14/2009

 U.S. Department of Transportation Federal Aviation Administration		<b>APPLICATION FOR U.S. AIRWORTHINESS CERTIFICATE</b>		INSTRUCTIONS - Print or type. Do not write in shaded areas; these are for FAA use only. Submit original only to an authorized FAA Representative. If additional space is required, use attachment. For special flight permits complete Sections II, VI and VII as applicable.																																																																																																																																																																																																																																																																																							
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<b>VI. PRODUCTION FLIGHT TESTING</b>	A. MANUFACTURER								
	NAME			ADDRESS					
	B. PRODUCTION BASIS (Check applicable item)								
			PRODUCTION CERTIFICATE (Give production certificate number) <span style="float: right;">—————→</span>						
			TYPE CERTIFICATE ONLY						
			APPROVED PRODUCTION INSPECTION SYSTEM						
<b>VII. SPECIAL FLIGHT PERMIT PURPOSES OTHER THAN PRODUCTION FLIGHT TEST</b>	C. GIVE QUANTITY OF CERTIFICATES REQUIRED FOR OPERATING NEEDS								
	DATE OF APPLICATION		NAME AND TITLE (Print or Type)		SIGNATURE				
	A. DESCRIPTION OF AIRCRAFT								
	REGISTERED OWNER			ADDRESS					
	BUILDER (Make)			MODEL					
	SERIAL NUMBER			REGISTRATION MARK					
	B. DESCRIPTION OF FLIGHT								
	FROM			TO					
	VIA			DEPARTURE DATE	DURATION				
	C. CREW REQUIRED TO OPERATE THE AIRCRAFT AND ITS EQUIPMENT								
						PILOT	CO-PILOT	FLIGHT ENGINEER	OTHER (Specify)
	D. THE AIRCRAFT DOES NOT MEET THE APPLICABLE AIRWORTHINESS REQUIREMENTS AS FOLLOWS:								
E. THE FOLLOWING RESTRICTIONS ARE CONSIDERED NECESSARY FOR SAFE OPERATION: (Use attachment if necessary)									
F. CERTIFICATION – I hereby certify that I am the registered owner (or his agent) of the aircraft described above; that the aircraft is registered with the Federal Aviation Administration in accordance with Title 49 of the United States Code 44101 <u>et seq.</u> and applicable Federal Aviation Regulations; and that the aircraft has been inspected and is safe for the flight described.									
DATE		NAME AND TITLE (Print or Type)				SIGNATURE			
<b>VIII. AIRWORTHINESS DOCUMENTATION (FAA DESIGNEE use only)</b>	<input checked="" type="checkbox"/>	A. Operating Limitations and Markings in Compliance with 14 CFR Section 91.9, as applicable.				G. Statement of Conformity, FAA Form 8130-9 (Attach when required)			
	<input checked="" type="checkbox"/>	B. Current Operating Limitations Attached				H. Foreign Airworthiness Certification for Import Aircraft (Attach when required)			
	<input checked="" type="checkbox"/>	C. Data, Drawings, Photographs, etc. (Attach when required)				<input checked="" type="checkbox"/>	I. Previous Airworthiness Certificate Issued in Accordance with 14 CFR Section <u>21.191 a, c, f</u> CAR _____ (Original Attached)		
	<input checked="" type="checkbox"/>	D. Current Weight and Balance information Available in Aircraft					J. Current Airworthiness Certificate Issued in Accordance with 14 CFR Section <u>21.191 e, c, f</u> _____ (Copy Attached)		
	<input type="checkbox"/>	E. Major Repair and Alteration, FAA Form 337 (Attach when required)				<input checked="" type="checkbox"/>	K. Light-Sport Aircraft Statement of Compliance, FAA Form 8130-15 (Attach when required)		
	<input checked="" type="checkbox"/>	F. This inspection Recorded in Aircraft Records							



UNITED STATES OF AMERICA  
DEPARTMENT OF TRANSPORTATION - FEDERAL AVIATION ADMINISTRATION

# SPECIAL AIRWORTHINESS CERTIFICATE

<b>A</b>	CATEGORY/DESIGNATION <b>EXPERIMENTAL (UNMANNED AIRCRAFT)</b>	
	PURPOSE <b>Research &amp; Development, Mkt. Survey, Crew Training</b>	
<b>B</b>	MANUFACTURER	NAME <b>N/A</b>
		ADDRESS <b>N/A</b>
<b>C</b>	FLIGHT	FROM <b>N/A</b>
		TO <b>N/A</b>
<b>D</b>	N-827AU	SERIAL NO. <b>AU-027</b>
	BUILDER <b>Aurora Flight Sciences</b>	MODEL <b>GE-50</b>
<b>E</b>	DATE OF ISSUANCE <b>January 29, 2009</b>	EXPIRY <b>January 28, 2010</b>
	OPERATING LIMITATIONS DATED <b>01/29/09</b>	ARE PART OF THIS CERTIFICATE
	SIGNATURE OF FAA REPRESENTATIVE <b>Henry K. Cooper</b>	DESIGNATION OR OFFICE NO. <b>ANE-MIDO-44</b>

Any alteration, reproduction or misuse of this certificate may be punishable by a fine not exceeding \$1,000 or imprisonment not exceeding 3 years, or both. THIS CERTIFICATE MUST BE DISPLAYED IN THE AIRCRAFT IN ACCORDANCE WITH APPLICABLE TITLE 14, CODE OF FEDERAL REGULATIONS (CFR).

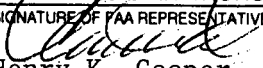
<b>A</b>	This airworthiness certificate is issued under the authority of Public Law 104-6, 49 United States Code (USC) 44704 and Title 14 Code of Federal Regulations (CFR).
<b>B</b>	The airworthiness certificate authorizes the manufacturer named on the reverse side to conduct production flight tests, and only production flight tests, of aircraft registered in his name. No person may conduct production flight tests under this certificate: (1) Carrying persons or property for compensation or hire; and/or (2) Carrying persons not essential to the purpose of the flight.
<b>C</b>	This airworthiness certificate authorizes the flight specified on the reverse side for the purpose shown in Block A.
<b>D</b>	This airworthiness certificate certifies that as of the date of issuance, the aircraft to which issued has been inspected and found to meet the requirements of the applicable CFR. The aircraft does not meet the requirements of the applicable comprehensive and detailed airworthiness code as provided by Annex 8 to the Convention On International Civil Aviation. No person may operate the aircraft described on the reverse side: (1) except in accordance with the applicable CFR and in accordance with conditions and limitations which may be prescribed by the Administrator as part of this certificate; (2) over any foreign country without the special permission of that country.
<b>E</b>	Unless sooner surrendered, suspended, or revoked, this airworthiness certificate is effective for the duration and under the conditions prescribed in 14 CFR, Part 21, Section 21.181 or 21.217.

UNITED STATES OF AMERICA  
DEPARTMENT OF TRANSPORTATION - FEDERAL AVIATION ADMINISTRATION

**SPECIAL AIRWORTHINESS CERTIFICATE**

**CANCELLED**

**JAN 29 2009**

<b>A</b>	CATEGORY/DESIGNATION		EXPERIMENTAL (UNMANNED AIRCRAFT)
	PURPOSE		Research & Development/Mkt. Survey/Crew Training
<b>B</b>	MANUFACTURER	NAME	N/A
		ADDRESS	N/A
<b>C</b>	FLIGHT	FROM	N/A
		TO	N/A
<b>D</b>	N- 827AU		SERIAL NO. AU-027
	BUILDER Aurora Flight Sciences		MODEL GE-50
<b>E</b>	DATE OF ISSUANCE (A) February 1, 2008		EXPIRY January 31, 2009
	OPERATING LIMITATIONS DATED 2/1/08		ARE PART OF THIS CERTIFICATE
	SIGNATURE OF FAA REPRESENTATIVE  Henry K. Cooper		DESIGNATION OR OFFICE NO. ANE-MIDO-44

Any alteration, reproduction or misuse of this certificate may be punishable by a fine not exceeding \$1,000 or imprisonment not exceeding 3 years, or both. THIS CERTIFICATE MUST BE DISPLAYED IN THE AIRCRAFT IN ACCORDANCE WITH APPLICABLE TITLE 14, CODE OF FEDERAL REGULATIONS (CFR).

<b>A</b>	This airworthiness certificate is issued under the authority of Public Law 104-6, 49 United States Code, (USC) 44704 and Title 14 Code of Federal Regulations (CFR).
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<b>E</b>	Unless sooner surrendered, suspended, or revoked, this airworthiness certificate is effective for the duration and under the conditions prescribed in 14 CFR, Part 21, Section 21.181 or 21.217.



COPY



New Cumberland Manufacturing Inspection District Office  
Bldg. 201, Room 102, 400 Airport Drive  
New Cumberland, PA 17070-3419

**Operating Limitations**  
**Experimental: Research and Development, Market Survey,**  
**and/or Crew Training**

<b>Registered Owner Name:</b> AURORA FLIGHT SCIENCES	<b>Aircraft Builder:</b> AURORA FLIGHT SCIENCES
<b>Registered Owner Address:</b> 9950 Wakemann Drive Manassas, VA 20110	<b>Year Manufactured:</b> 2006
<b>Aircraft Description:</b> Ducted Fan Vertical Take-Off and Landing	<b>Aircraft Serial Number:</b> AU-027
<b>Aircraft Registration:</b> N827AU	<b>Aircraft Model Designation:</b> GoldenEye 50 (GE-50)
	<b>Engine Model:</b> Desert Aircraft DA-50-R

**The following conditions and limitations apply to all unmanned aircraft system (UAS) flight operations for the Aurora GE-50 while operating in the National Airspace System (NAS).**

**1. General Information.**

**a. Integrated system.** For the purposes of this special airworthiness certificate and operating limitations, the GE-50 operated by Aurora Flight Sciences is considered to be an integrated system. The system is composed of the following:

- (1) Aurora GE-50, serial number: AU-027.
- (2) UAS control station(s), that is, fixed, mobile, ground-based, or airborne.
- (3) Telemetry, launch, and recovery equipment.
- (4) Communications and navigation equipment, including ground and/or air equipment used for command and control of the Aurora GE-50.



(5) Equipment on the ground and in the air used for communication with the chase aircraft, other members of the flight crew, observers, air traffic control (ATC), and other users of the NAS.

**b. Compliance with 14 CFR part 61 (Certification: Pilots, Flight Instructors, and Ground Instructors) and part 91 (General Operating and Flight Rules).** Unless otherwise specified in this document, the UA pilot-in-command (PIC) and Aurora Flight Sciences must comply with all applicable sections and parts of 14 CFR including, but not limited to, parts 61 and 91.

**c. Operational requirements.**

(1) No person may operate this UAS for other than the purpose of research and development, market survey, and/or crew training, to accomplish the flight operation outlined in Aurora Flight Sciences program letter dated 01/12/09, which describes compliance with § 21.193(d), Experimental certificates: General, and has been made available to the UA PIC.

(2) This UAS must be operated in accordance with applicable air traffic and general operating rules of part 91 and all additional limitations herein prescribed under the provisions of § 91.319(i), Aircraft having experimental certificates: Operating limitations.

(3) Aurora Flight Sciences must accumulate at least 50 flight hours under its experimental airworthiness certificate before customer crew training is permitted, in accordance with § 21.195(d), Experimental certificates: Aircraft to be used for market surveys, sales demonstrations, and customer crew training.

**d. UA condition.** The UA PIC must determine that the UA is in a condition for safe operation and in a configuration appropriate for the purpose of the intended flight.

**e. Multiple-purpose operations.** When changing between operating purposes of a multiple purpose certificate, the operator must determine that the aircraft is in a condition for safe operation and appropriate for the purpose intended. A record entry will be made by an appropriately rated person (that is, an individual authorized by the applicant and acceptable to the FAA) to document that finding in the maintenance records.

**f. Operation exceptions.** No person may operate this UA to carry property for compensation or hire (§ 91.319(a)(2)).

**g. UA markings.**

(1) This UA must be marked with its U.S. registration number in accordance with part 45 or alternative marking approval issued by the FAA Production and Airworthiness Division (AIR-200).

(2) This UA must display the word *Experimental* in accordance with § 45.23(b), Display of marks, unless otherwise granted an exemption from this requirement.

**h. Required documentation.** Before conducting the initial flight of the GE-50, Aurora Flight Sciences, must forward a copy of the GE-50 program letter, special airworthiness certificate, and operating limitations to the following personnel:



(1) Peter Acevedo, FAA Air Traffic Representative, Eastern Service Center, System Support, 1701 Columbia Ave, College Park, GA 30337, telephone (404) 305-5598, email [peter.k.acevedo@faa.gov](mailto:peter.k.acevedo@faa.gov).

(2) Richard Posey, Aviation Safety Inspector, Production and Airworthiness Division, AIR-200, 800 Independence Ave, SW, Washington, DC 20591, telephone (202) 267-9538, email [richard.posey@faa.gov](mailto:richard.posey@faa.gov).

**i. Change in registrant address.** Section 47.45, Change of address, requires that the FAA Aircraft Registry be notified within 30 days of any change in the aircraft registrant's address. Such notification is to be made by providing AC Form 8050-1, Aircraft Registration Application, to the FAA Aircraft Registration Branch (AFS-750) in Oklahoma City, Oklahoma.

**j. Certificate display and manual availability.** The airworthiness and registration certificates must be displayed, and the aircraft flight manual must be available to the pilot, as prescribed by the applicable sections of 14 CFR, or as prescribed by an exemption granted in accordance with 14 CFR part 11, General Rulemaking Procedures to Aurora Flight Sciences.

**2. Program Letter.** The Aurora Flight Sciences GE-50 program letter, dated 01/12/09, will be used as a basis for determining the operating limitations prescribed in this document. All flight operations must be conducted in accordance with the provisions of this document.

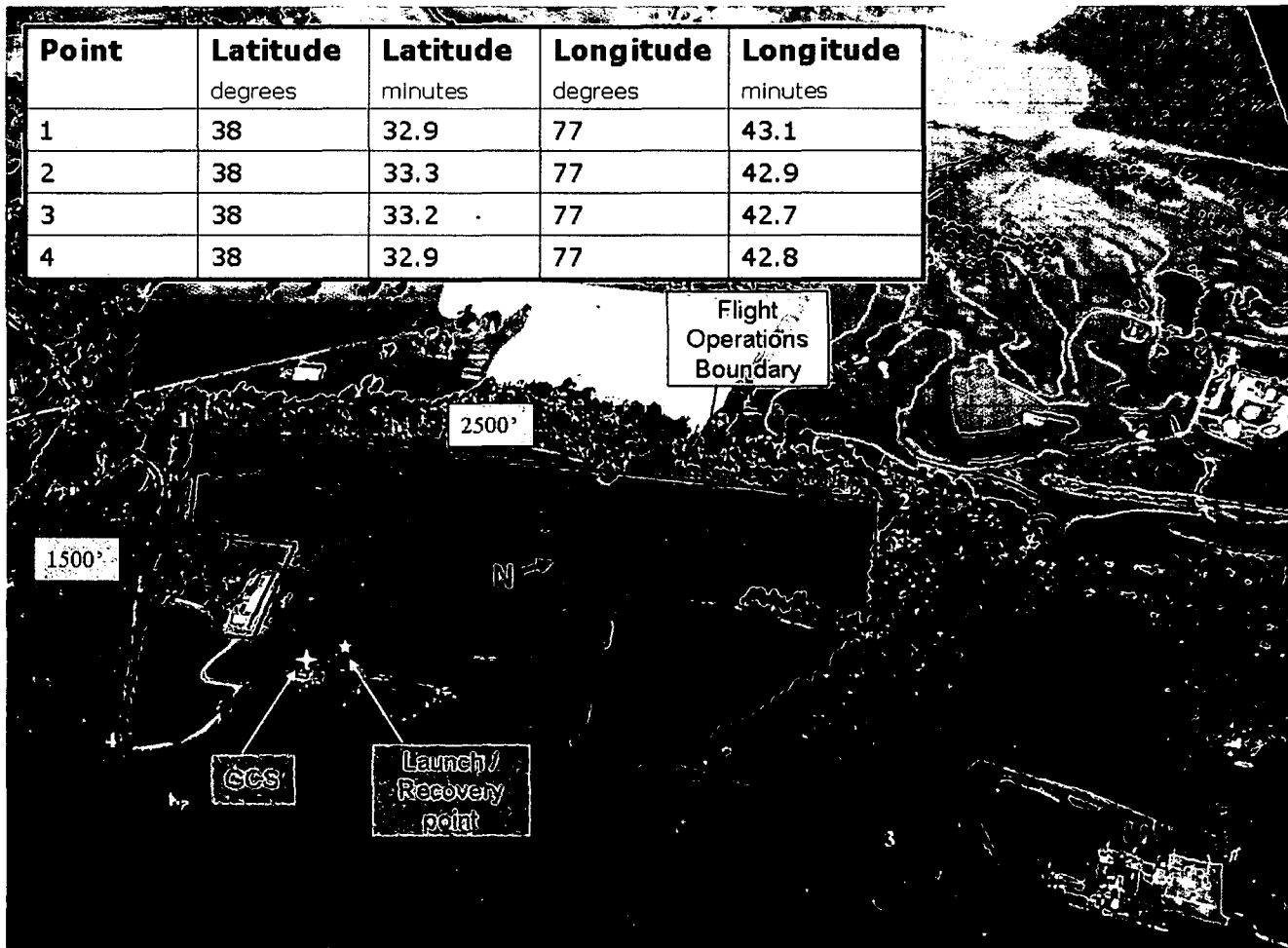
### **3. Authorized Flight Operations Area.**

**a. Description of the authorized flight operations area.** The base of operations for the UA shall be:

Flying Circus Aerodrome (3VA3)  
5414 Ritchie Rd  
Bealeton, VA 22712

**b. Flight test area.** The flight test operations area authorized for the UA at Flying Circus Aerodrome (3VA3) is graphically depicted below. No flights shall exceed 400 feet AGL.





**c. Authorized flight times and conditions.** All flight operations must be conducted during daylight hours under visual flight rules (VFR).

**d. Notification.** Aurora shall notify the airport manager/owner, prior each operation, for coordination with any other potential activity in the vicinity.

**e. Criteria for remaining in the flight test area.** The UAS PIC must ensure all UA flight operations remain within the lateral and vertical boundaries of the flight test area. Furthermore, the UAS PIC must take into account all factors that may affect the capability of the UA to remain within the flight test area. This includes, but is not limited to, considerations for wind, gross weight, and glide distances.

**f. Incident/accident reporting.** Any incident/accident and any flight operation that transgresses the lateral or vertical boundaries of the flight test area or any restricted airspace must be reported to the FAA within 24 hours. This information must be reported to the Unmanned Aircraft Program Office, AIR-160. AIR-160 can be reached by telephone at 202-385-4636 and fax at 202-385-4651. Accidents must be reported to the National Transportation Safety Board (NTSB) per instructions contained on the NTSB Web site: [www.nts.gov](http://www.nts.gov). Further flight operations must not be conducted until the incident is





reviewed by AIR-160 and authorization to resume operations is provided to Aurora Flight Sciences.

#### **4. UA Pilots and Observers.**

##### **a. UA PIC roles and responsibilities.**

- (1) The UA PIC must perform crew duties for only one UA at a time.
- (2) All flight operations must have a designated UA PIC. The UA PIC has responsibility over each flight conducted and is accountable for the UA flight operation.
- (3) The UA PIC is responsible for the safety of the UA as well as persons and property along the UA flight path. This includes, but is not limited to, collision avoidance and the safety of persons and property in the air and on the ground.
- (4) The UA PIC must avoid densely populated areas (§ 91.319) and exercise increased vigilance when operating within or in the vicinity of published airway boundaries.

##### **b. UA PIC certification and ratings requirements.**

- (1) The UA PIC must hold and be in possession of, at a minimum, an FAA private pilot certificate, with either an airplane, rotorcraft, or powered-lift category; and single- or multiengine class ratings, appropriate to the type of UA being operated.
- (2) The UA PIC must have and be in possession of a valid second-class (or higher) airman medical certificate issued under 14 CFR part 67, Medical Standards and Certification.

##### **c. UA PIC currency, flight review, and training.**

- (1) No person may act as pilot in command of an unmanned aircraft unless that person has made at least three takeoffs and three landings in manned aircraft within the preceding 90 days acting as the sole manipulator of the flight controls.
- (2) The UA PIC must have a flight review in manned aircraft every 24 calendar months in accordance with § 61.56, Flight review.
- (3) The UA PIC must maintain currency in unmanned aircraft in accordance with Aurora Flight Sciences company procedures.
- (4) The UA PIC must have a flight review in unmanned aircraft every 24 calendar months in accordance with Aurora Flight Sciences procedures.
- (5) All UA PIC's must have successfully completed applicable Aurora Flight Sciences training for the UAS.

##### **d. Supplemental UA pilot roles and responsibilities.**

- (1) Any additional UA pilot(s) assigned to a crew station during UA flight operations will be considered a supplemental UA pilot.
- (2) A supplemental UA pilot assists the PIC in the operation of the UA and may do so at the same or a different control station as the PIC. The UA PIC will have operational override capability over any supplemental UA pilots, regardless of position.
- (3) A supplemental UA pilot must perform crew duties for only one UA at a time.



**e. Supplemental UA pilot certification.** The supplemental UA PIC need not be a certificated pilot, but must have successfully completed a recognized private pilot ground school program.

**f. Supplemental UA pilot currency, flight review, and training.**

(1) All UA pilots must maintain currency in unmanned aircraft in accordance with Aurora Flight Sciences company procedures.

(2) All UA pilots must have a flight review in unmanned aircraft every 24 calendar months in accordance with Aurora Flight Sciences procedures.

(3) All UA pilots must have successfully completed applicable Aurora Flight Sciences training for the UAS.

**g. Observer roles and responsibilities.** The task of the observer is to provide the UA PIC(s) with instructions to maneuver the UA clear of any potential collision with other traffic. To satisfy these requirements:

(1) The observer must perform crew duties for only one UA at a time.

(2) At no time will the observer permit the UA to operate beyond the line-of-sight necessary to ensure maneuvering information can be reliably determined.

(3) At no time will the observer conduct his/her duties more than 1300 feet laterally or 400 feet vertically from the UA.

(4) An observer must maintain continuous visual contact with the UA to discern UA attitude and trajectory in relation to conflicting traffic.

(5) An observer may be positioned in a chase aircraft. When a chase aircraft is used, it must maintain a reasonable proximity, and must position itself relative to the UA to reduce the hazard of collision in accordance with § 91.111, Operating near other aircraft. When the observer is located in a chase aircraft, the observer's duties must be dedicated to the task of observation only. Concurrent duty as pilot of the chase aircraft is not authorized.

(6) Observers must continually scan the airspace for other aircraft that pose a potential conflict.

(7) All flight operations conducted in the flight test area must have an observer to perform traffic avoidance and visual observation to fulfill the see-and-avoid requirement of § 91.113, Right-of-way rules: Except water operations.

**h. Observer certification.**

(1) All observers must either hold, at a minimum, an FAA private pilot license or military equivalent, or must have successfully completed specific observer training acceptable to the FAA. An observer does not require currency as a pilot.

(2) All observers must have in their possession a valid second-class (or higher) airman medical certificate issued under part 67.

**i. Observer training.**



(1) All observers must be thoroughly trained, be familiar with, and possess operational experience with the equipment being used. Such training is necessary for observation and detection of other aircraft for collision avoidance purposes as outlined in Aurora Flight Sciences program letter.

(2) All observers must have successfully completed applicable Aurora Flight Sciences training for the UAS.

**5. Equipage.** The GE-50 Ground Control Station shall be equipped with two-way communications equipment allowing for communications between the UA pilot and Air Traffic Control.

**6. Communications.**

**a. Before UA flights.** Before conducting operations, the frequency spectrum used for operation and control of the UA must be approved by the Federal Communications Commission or other appropriate government oversight agency.

**b. During UA flights.**

(1) Appropriate air traffic frequencies must be monitored during flight operations.

(2) All UA positions must maintain two-way communications with each other during all operations. If unable to maintain two-way communication, the UA PIC will expeditiously return the UA to its base of operations while remaining within the flight test area and conclude the flight operation.

**7. Flight Conditions.**

**a. Daylight operations.** All flight operations must be conducted during daylight hours in visual meteorological conditions (VMC), including cloud clearance minimums as specified in § 91.155, Basic VFR weather minimums. Flight operation in instrument meteorological conditions (IMC) is not permitted.

**b. Prohibitions.**

(1) The UA is prohibited from aerobatic flight, that is, an intentional maneuver involving an abrupt change in the UA's attitude, an abnormal acceleration, or other flight action not necessary for normal flight. (See § 91.303, Aerobatic flight.) If aerobatic flight is anticipated, it must be thoroughly discussed during the system review and be appropriately described in the operating limitations.

(2) Flight operations must not involve carrying hazardous material or the dropping of any objects or external stores.

(3) Each UA must be operated by only one control station at a time. A control station may not be used to operate multiple UAS.

**c. Notice to airman.** Aurora Flight Sciences must request the issuance of a Notice to Airman (NOTAM) through the local Automated Flight Service Station at least 24 hours before flight operation.

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## 8. Flight Termination and Lost Link Procedures.

**a. Flight termination.** In accordance with Aurora Flight Sciences program letter, dated 01/12/09, flight termination must be initiated at any point that safe operation of the UA cannot be maintained or if hazard to persons or property is imminent.

**b. Lost link procedures.** In the event of lost link, the UA must provide a means of automatic recovery that ensures airborne operations are predictable and that the UA remains within the flight test area. The chase aircraft or observer, all other UAS control stations, and the appropriate ATC facility will be immediately notified of the lost link condition and the expected UA response.

## 9. Maintenance and Inspection.

**a. General requirements.** The UAS must not be operated unless it is inspected and maintained in accordance with the GE-50 Preflight Inspection report AR07-069A, and the GE-50 Postflight Inspection report AR07-070A, both dated July 26, 2007, or later accepted FAA revision. Aurora Flight Sciences must establish and maintain aircraft maintenance records (see paragraph 10(d) below).

**b. Inspections.** No person may operate this UAS within the preceding 12 calendar months unless it has had a condition inspection performed according to the FAA-accepted Aurora Flight Sciences GE-50 Preflight Inspection report AR07-069A, and the GE-50 Postflight Inspection report AR07-070A, both dated July 26, 2007, and was found to be in a condition for safe operation. This inspection will be recorded in the UAS maintenance records as described in paragraph 10(d) below.

**c. Authorized inspectors.** Only those individuals trained and authorized by Aurora Flight Sciences and acceptable to the FAA may perform the inspections and maintenance required by these operating limitations.

**d. Maintenance and inspection records.** Maintenance and inspections of the UAS must be recorded in the UAS maintenance records. The following information must be recorded:

(1) Maintenance record entries must include a description of the work performed, the date of completion for the work, the UAS's total time-in-service, and the name and signature of the person performing the work.

(2) Inspection entries must contain the following, or a similarly worded, statement: *I certify that this UAS was inspected on (date), in accordance with the scope and detail of the (applicant name) Inspection and Maintenance Program, and was found to be in a condition for safe operation.*

(3) UAS instruments and equipment required to be installed must be inspected and maintained in accordance with the requirements of the Aurora Flight Sciences FAA-accepted Aurora Flight Sciences GE-50 Preflight Inspection report AR07-069A, and the GE-50 Postflight Inspection report AR07-070A, both dated July 26, 2007. Any maintenance or inspection of this equipment must be recorded in the UAS maintenance records.

**10. Information Reporting.** Aurora Flight Sciences shall provide the following information to Donald E Grampp@faa.gov, and AIR-200 on a monthly basis:

1000



- a. Number of flights conducted under this certificate.
- b. Pilot duty time per flight.
- c. Unusual equipment malfunctions (hardware or software).
- d. Deviations from ATC instructions.
- e. Unintended entry into lost link flight mode that results in a course change.

## 11. Revisions and Other Provisions.

**a. Experimental certificates, program letters, and operating limitations.** The experimental certificate, FAA-accepted Aurora Flight Sciences program letter, and operating limitations cannot be reissued, renewed, or revised without application being made to the New Cumberland Manufacturing Inspection District Office (MIDO), in coordination with AIR-200. AIR-200 will be responsible for FAA Headquarters internal coordination with the Aircraft Certification Service, Flight Standards Service, Air Traffic Organization, Office of the Chief Council, and Office of Rulemaking.

**b. Certificates of waiver or authorization.** Aurora Flight Sciences shall immediately notify the Production and Airworthiness Division, AIR-200, and the New Cumberland MIDO, if there is any plan for requesting a Certificate of Authorization or Waiver (COA) for UAS operations during the time the experimental certificate is in effect. An entry in the aircraft logbook is required to document that the aircraft flight authority has been changed from the experimental certificate to COA. When COA operations are concluded and the aircraft resumes flying under the experimental certificate, a record entry will be made in the aircraft logbook by an appropriately rated person to document that the aircraft is in a condition for safe operation and appropriately configured.

**c. Amendments and cancellations.** The provisions and limitations annotated in this operational approval may be amended or cancelled at any time as deemed necessary by the FAA.

**d. Reviews of revisions.** All revisions to Aurora FAA-accepted GE-50 Preflight Inspection report AR07-069A, and the GE-50 Postflight Inspection report AR07-070A both dated July 26, 2007, or later FAA-accepted revision must be reviewed and accepted by the Washington Flight Standards District Office.

## 12. UAS Modifications.

**a. Software and system changes.** All software and system changes will be documented as part of the normal maintenance procedures and will be available for inspection. All software and system changes shall be inspected and approved per Aurora's maintenance procedures. All software changes to the aircraft and control station are categorized as major changes, and must be provided in summary form at the time they are incorporated.

**b. Major modifications.** All major modifications, whether performed under the experimental certificate, COA, or other authorizations, that could potentially affect the safe operation of the system, must be documented and provided to the FAA before operating the aircraft under this certificate. Major modifications incorporated under COA or other



authorization needs to be provided only if the aircraft is flown under these authorizations during the effective period of the experimental certificate.

**c. Submission of modifications.** All information requested must be provided to AIR-200.

End of Limitations

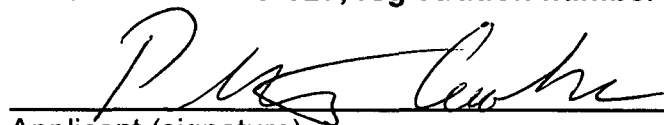


Henry K. Cooper  
Aviation Safety Inspector  
New Cumberland Manufacturing Inspection District  
Office Bldg. 201, Room 402, 400 Airport Drive  
New Cumberland, PA 17070-3419

1/29/09  
Date:

**I certify that I have read and understand the operating limitations and conditions that are a part of the special airworthiness certificate, FAA Form 8130-7, issued on January 29, 2009, for the purposes of research and development, market survey, and/or crew training.**

**This special airworthiness certificate is issued for Aurora Flight Sciences GE-50, serial number AU-027, registration number N827AU.**



Applicant (signature)

1/29/09  
Date:

Name: Peter Cooke

Title: GoldenEye 50 Chief Engineer

Company: Aurora Flight Sciences





U.S. Department  
of Transportation  
**Federal Aviation  
Administration**

(A) 02/01/08

New Cumberland Manufacturing Inspection District  
Office  
Bldg. 201, Rm. 102,  
400 Airport Drive  
New Cumberland, PA 17070

**CANCELLED**

**JAN 29 2009**

**EXPERIMENTAL - OPERATING LIMITATIONS**

**RESEARCH AND DEVELOPMENT, CREW TRAINING, and MARKET SURVEY.**

<b>REGISTERED OWNER NAME:</b> AURORA FLIGHT SCIENCES CORPORATION	<b>AIRCRAFT BUILDER:</b> AURORA FLIGHT SCIENCES CORPORATION
<b>REGISTERED OWNER ADDRESS:</b> 9950 WAKEMAN DRIVE MANASSAS, VA 20110	<b>YEAR MANUFACTURED:</b> 2006
<b>AIRCRAFT DESCRIPTION:</b> DUCTED FAN VTOL	<b>AIRCRAFT SERIAL NUMBER:</b> AU-027
<b>AIRCRAFT REGISTRATION:</b> N827AU	<b>AIRCRAFT MODEL DESIGNATION:</b> GOLDEN EYE 50
	<b>ENGINE MODEL:</b> DESERT AIRCRAFT DA-50-R
	<b>PROPELLER MODEL:</b> CUSTOM 7-BLADE LIFT FAN

**The following conditions and limitations apply to all Aurora Flight Sciences Golden Eye 50, Unmanned Aircraft System flight operations, while operating in the National Airspace System (NAS). These conditions and limitations must be accessible to the pilot in command at all times.**

**1. GENERAL:**

a. For the purposes of this Special Airworthiness Certificate and Operating Limitations, the Golden Eye 50 (GE-50) Unmanned Aircraft System (UAS), owned and operated by Aurora Flight Sciences, is considered to be an integrated system. The system is composed of the GE-50 aircraft, S/N AU-027, UA control station(s) (fixed or mobile), telemetry, navigation and communications equipment to include ground and airborne equipment that is used for control of the GE-50 UA. The ground equipment used for communication with Air Traffic Control during UAS operations is considered part of the UAS.



JAN 29 2009  
CANCELLED

b. Unless otherwise specified in this document, the UA Pilot-in-Command (PIC) and Aurora shall comply with all applicable sections and parts of 14 CFR including, but not limited to, parts 61 and 91.

c. No person may operate this UA for other than the purpose of Research and Development, Market Survey and/or Crew Training, to accomplish the flight operations outlined in Aurora Flight Sciences Program Letter, Aurora Report Number AR07-139 dated October 3, 2007 which describes compliance with § 21.193(d), and has been made available to the pilot in command of the UA. In addition, this UA must be operated in accordance with applicable air traffic and general operating rules of part 91, and all additional limitations herein prescribed under the provisions of § 91.319(e).

d. The UA PIC must determine that the UA is in a condition for safe operation and in a configuration appropriate for the purpose of the intended flight.

e. No person may operate this UA to carry property for compensation or hire.

f. This UA must be marked with its U.S. Registration number in accordance with 14 CFR part 45 or exemption thereto.

g. This UA must display the word "EXPERIMENTAL" in accordance with § 45.23(b) or exemption thereto.

h. Prior to conducting initial GE-50 flight operations, Aurora must forward an electronic copy copy of the GE-50 Program Letter, Special Airworthiness Certificate, and Operating Limitations to the following FAA personnel:

1) Lynda Otting, FAA Air Traffic Representative, Eastern Service Center, System Support, 1701 Columbia Ave, College Park, GA 30337, telephone (404) 305-5577, email [lynda.g.otting@faa.gov](mailto:lynda.g.otting@faa.gov).

2) Richard Posey, Aviation Safety Inspector, Production and Airworthiness Division, AIR-200, 800 Independence Ave, SW, Washington, DC 20591, telephone (202) 267-9538, email [richard.posey@faa.gov](mailto:richard.posey@faa.gov).

i. Section 47.45 requires that the FAA Aircraft Registry must be notified within 30 days of any change in the aircraft registrant's address. Such notification is to be made by submitting AC Form 8050-1 to AFS-750 in Oklahoma City, Oklahoma.

**2. PROGRAM LETTER:** The Aurora Flight Sciences Program Letter, Aurora Report Number AR07-139 dated October 3, 2007 shall be used as a basis for the determination of the operating limitations prescribed in this document. All flight operations must be conducted in accordance with the provisions of these operating limitations.

### **3. AUTHORIZED FLIGHT OPERATIONS AREA:**

a. The base of operations for the UA shall be:





JAN 29 2009

Flying Circus Aerodrome (3VA3)  
5414 Ritchie Rd  
Bealeton, VA 22712

b. The flight test operations area authorized for the UA at Flying Circus Aerodrome (3VA3) are graphically depicted below. No flights shall exceed 400 feet AGL.

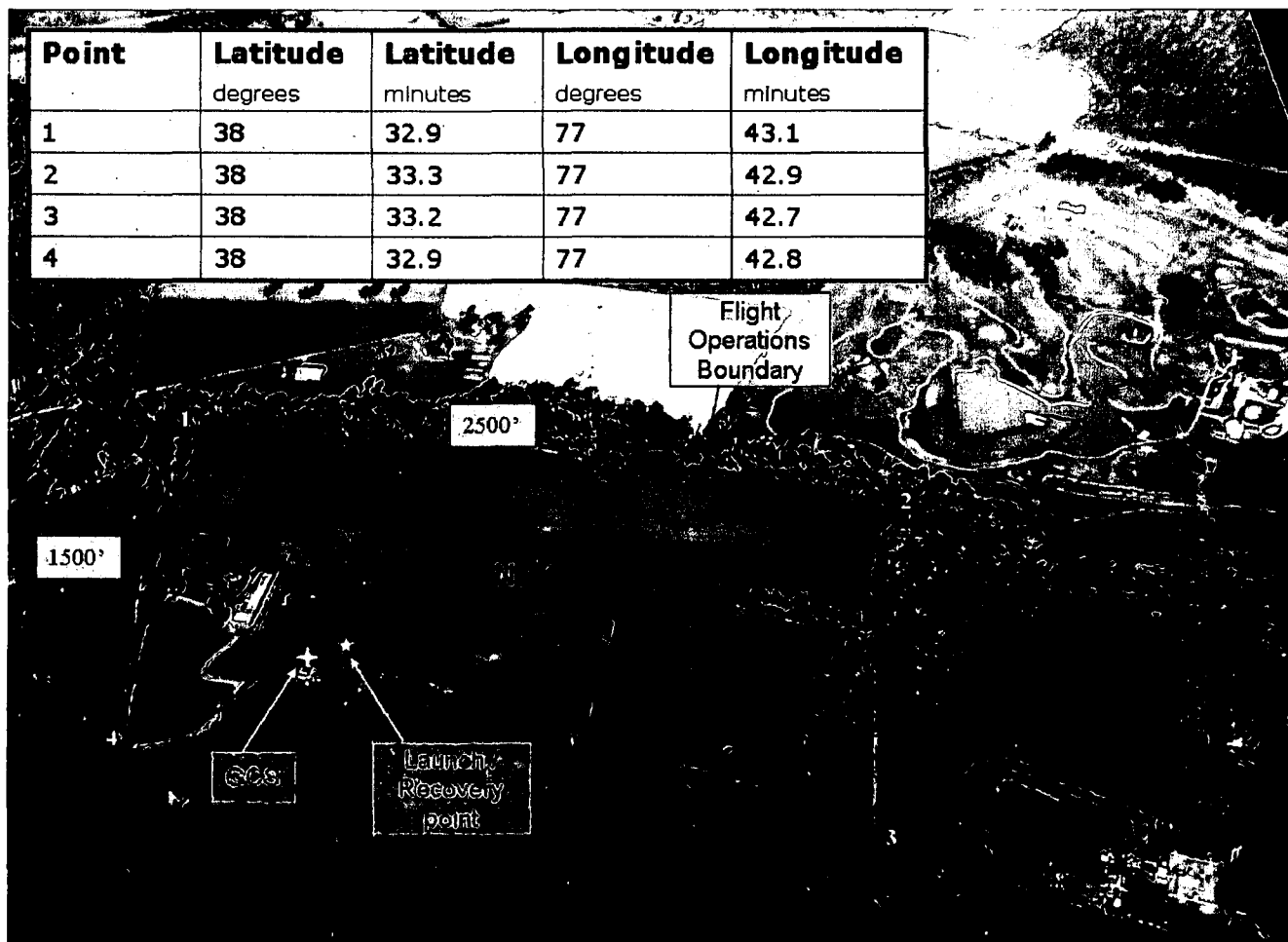


Figure 1. Proposed operations area at Flying Circus Aerodrome

c. Aurora shall notify the airport manager/owner, prior to each operation for coordination with any other potential activity in the vicinity.

d. The UA PIC shall ensure that all UA flight operations remain within the lateral and vertical boundaries of the flight test operations area at The Flying Circus Aerodrome (3AV3). Furthermore, the UA PIC shall take into account all factors that may affect the capability of remaining within the flight test operations area at The Flying Circus Aerodrome (3AV3). This includes, but is not limited to, considerations for wind, gross weight, and glide distances.



e. Incident / Accident Reporting. Any flight operation that transgresses the lateral or vertical boundaries of the flight test operations area at The Flying Circus Aerodrome (3AV3) shall be immediately concluded, and Air Traffic Control notified of the flight status. Any incident or accident, and any flight operation that transgresses the lateral or vertical boundaries of the flight test operations area at The Flying Circus Aerodrome (3AV3) or any Special Use Airspace shall be reported to the FAA Unmanned Aircraft Program Office (UAPO), AIR-160, as soon as practicable, but always within 24 hours. The point of contact to report this information is the Manager of the UAPO, AIR-160, Mr. Doug Davis. Mr. Davis can be reached by phone at 202-385-4636, fax at 202-385-4651, or by e-mail at [Kenneth.d.davis@faa.gov](mailto:Kenneth.d.davis@faa.gov). Accidents shall be reported to the National Transportation Safety Board per instructions contained on the NTSB website: [www.nts.gov](http://www.nts.gov). Further flight operations shall not be conducted until the incident / accident is reviewed by ATO, AFS, and AIR-160, and authorization to resume operations is received.

f. Aircraft operations for the purpose of market survey cannot be performed until after 50 flight hours have been accomplished. A logbook entry is required as evidence of compliance.

#### **4. UA PILOTS and OBSERVERS:**

a. All flight operations shall have a designated UA Pilot-In-Command (PIC). Any additional UA pilot(s) assigned to a crew station during UA flight operations shall be considered a Supplemental UA Pilot. The UA PIC shall have responsibility over each flight conducted and be held accountable for the UA flight operation.

b. The UA PIC is responsible for the safety of the UA as well as persons and property along the UA flight path. This includes, but is not limited to, collision avoidance and the safety of persons and property in the air and on the ground. The UA PIC shall avoid densely populated areas (§ 91.319) and exercise increased vigilance when operating within or in the vicinity of published airway boundaries.

c. The UA PIC shall hold, at a minimum, an FAA Private Pilot certificate, with either an Airplane or Rotorcraft category, Single or Multiengine class ratings, or military equivalent, and have it in his/her possession.

d. The Supplemental Pilot need not be a certificated pilot, but must have successfully completed a recognized Private Pilot ground school and successfully completed the private pilot written test.

e. The UA PIC shall have operational override capability over any Supplemental Pilot, regardless of position.

f. The UA PIC shall maintain currency in manned aircraft in accordance with § 61.57.

g. The UA PIC shall have a Flight Review in manned aircraft every 24 calendar months in accordance with § 61.56.

h. All UA Pilots shall maintain currency in unmanned aircraft in accordance with Aurora GoldenEye-50 Operator Training AR07-102.



i. All UA pilots shall have a Flight Review in unmanned aircraft every 24 calendar months in accordance with Aurora company procedures.

j. All flight operations conducted shall have an Observer to perform traffic avoidance and visual observation to fulfill the "see and avoid" requirement of § 91.113.

k. All Observers shall:

1) Hold at a minimum, an FAA Private Pilot certificate or military equivalent (an Observer does not require currency as a pilot); or,

2) In lieu of a Pilot certificate, have successfully completed specific Observer training acceptable to the FAA.

l. The UA PIC and Observer(s) must have in their possession a valid third class (or higher) airman medical certificate that has been issued under 14 CFR part 67.

m. UA Pilots and Observers shall perform crew duties for only one UA at a time.

n. All Observers must be thoroughly trained, familiar with, and possess, operational experience with the equipment being utilized for observation and detection of other aircraft for collision avoidance purposes as outlined in the Aurora Program Letter.

o. Observer Responsibilities: The task of the Observer is to provide the UA pilot(s) with instructions to maneuver the UA clear of any potential collision with other traffic. Observer duties require continuous visual contact with the UA at all times in such a manner as to be able to discern UA attitude and trajectory in relation to conflicting traffic. At no time shall Observers conduct their duties more than 1300 feet laterally or 400 feet vertically from the UA.

## **5. COMMUNICATIONS:**

a. Appropriate Air Traffic frequencies shall be monitored during flight operations.

b. All UAS crew positions must maintain two-way communications with each other during all operations. If unable to maintain two-way communication, the UA will be expeditiously returned to its base of operations while remaining within the Primary Containment Area, and conclude the flight operation.

c. Spectrum used for operation and control of the UA must be approved by the Federal Communications Commission or other appropriate government oversight agency prior to operations being conducted.

## **6. FLIGHT CONDITIONS:**

a. All flight operations must be conducted during daylight hours in visual meteorological conditions (VMC), including cloud clearance minimums as specified in § 91.155. Flight operation in instrument meteorological conditions (IMC) is not permitted.



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JAN 29 2009

b. The UA is prohibited from aerobatic flight, that is, an intentional maneuver involving an abrupt change in the UA's attitude, an abnormal acceleration, or other flight action not necessary for normal flight (§ 91.303).

c. Flight operations must not involve carrying hazardous material or the dropping of any objects or external stores.

d. The UA and shall be equipped with operable strobe/anti-collision lights and shall be illuminated during operations.

e. Aurora Flight Sciences must request the issuance of a Notice to Airman (NOTAM) through the local Automated Flight Service Station at least twenty-four 24 hours prior to flight operation.

#### **7. FLIGHT TERMINATION & LOST LINK PROCEDURES:**

a. In accordance with Aurora Flight Sciences Program Letter, Aurora Report Number AR07-139 dated October 3, 2007, flight termination must be initiated at any point that safe operation of the UA cannot be maintained.

b. In the event of lost link, the UA must provide a means of automatic recovery that ensures airborne operations are predictable and that the UA remains within the flight test area. The observer will be immediately notified of the lost link condition and the expected UA response.

#### **8. MAINTENANCE:**

a. The GE-50 UAS must not be operated unless it is inspected and maintained in accordance with the GE-50 Preflight Inspection report AR07-069A, and the GE-50 Postflight Inspection report AR07-070A both dated July 26, 2007, or later FAA-accepted revision. Maintenance must be recorded in the UAS maintenance records.

b. No person may operate this UAS unless within the preceding 12 calendar months it has had a condition inspection performed in accordance with, FAA-accepted, GE-50 Preflight Inspection report AR07-069A, and the GE-50 Postflight Inspection report AR07-070A both dated July 26, 2007, and was found to be in a condition for safe operation. This inspection will be recorded in the UAS maintenance records.

c. Only those individuals authorized by Aurora Flight Sciences, and acceptable to the FAA, may perform inspections required by these operating limitations.

d. Inspections of the UAS must be recorded in the UAS maintenance records showing the following, or a similarly worded, statement: "I certify that this UAS has been inspected on [insert date] in accordance with the scope and detail of the GE-50 Preflight Inspection report AR07-069A, and the GE-50 Postflight Inspection report AR07-070A both dated July 26, 2007." The entry will include the UAS's total time-in-service, and the name and signature of the person performing the inspection and the date the inspection was performed.





e. UAS instruments and equipment installed must be inspected and maintained in accordance with the requirements of the GE-50 Preflight Inspection report AR07-069A, and the GE-50 Postflight Inspection report AR07-070A both dated July 26, 2007. Any maintenance or inspection of this equipment must be recorded in the UAS maintenance records.

#### **9. EQUIPAGE:**

The GE-50 Ground Control Station shall be equipped with two-way communications equipment allowing for communications between the UA pilot and Air Traffic Control.

#### **10. INFORMATION REPORTING**

Aurora Flight Sciences shall provide the following information to Donald E Grampp@faa.gov, AIR-200 on a monthly basis.

- a. Number of flights conducted under this certificate.
- b. Pilot duty time per flight.
- c. Unusual equipment malfunctions (hardware or software), if any.
- d. Deviations from ATC instructions.
- e. Unintended entry into lost link flight mode that results in a course change.

#### **11. REVISIONS**

a. The experimental certificate, Aurora Flight Sciences FAA-accepted program letter, and operating limitations cannot be reissued, renewed, or revised without first notifying the Production and Airworthiness Division, AIR-200 and application being made to the New Cumberland MIDO. AIR-200 will be responsible for headquarters internal coordination with the Aircraft Certification Service, Flight Standards Service, Air Traffic, Office of Chief Council, and Office of Rulemaking.

b. No Certificate of Authorization or Waiver may be issued in association with this Experimental Certificate unless it is coordinated with AIR-200.

c. The provisions and limitations annotated in this operational approval may be amended or cancelled at any time as deemed necessary by the FAA.

d. All revisions to Aurora FAA-accepted GE-50 Preflight Inspection report AR07-069A, and the GE-50 Postflight Inspection report AR07-070A both dated July 26, 2007, or later FAA-accepted revision must be reviewed and accepted by the Washington Flight Standards District Office.

#### **12. UA MODIFICATIONS**

a. All software and system changes will be documented as part of the normal maintenance procedures and be available for inspection. All software and system changes shall be inspected and approved per Aurora's maintenance procedures. All software changes to the aircraft and GCS are categorized as major changes, and shall be provided in summary form at the time they are incorporated.

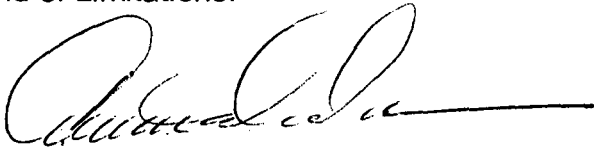


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JAN 29 2009

b. All major modifications, whether performed under the experimental certificate, COA, or other authorizations, that could potentially effect the safe operation of the system, shall be documented and shall be provided to the FAA prior to operating the aircraft under this certificate. Major modifications incorporated under COA or other authorization need only be provided if the aircraft is flown under these authorizations during the effective period of the experimental certificate.

c. All information requested shall be provided to AIR-200.

End of Limitations.



Henry K. Cooper  
Senior Aviation Safety Inspector  
New Cumberland Manufacturing Inspection District Office  
Bldg. 201, Rm. 102,  
400 Airport Road  
New Cumberland, PA 17070-3419

Issuance Date (Amended):  
**February 1, 2008**

**The Special Airworthiness Certificate and accompanying Operating Limitations expire on**

**I certify that I have read and understand the operating limitations, and conditions, that are a part of the Special Airworthiness Certificate; FAA Form 8130-7 issued on for the purposes of Research and Development, Market Survey and/or Crew Training.**

**This Special Airworthiness Certificate is issued for the Aurora Flight Sciences Systems, UA model "GE-50," serial number AU-027, registration number N827AU.**



**Applicant:**

**Date:** February 1, 2008

**Name: Nancy R. Vetere**

**Title: UAV Flight Operations Manager**

**Company: Aurora Flight Sciences**



## FAA FORM 8130-6, APPLICATION FOR U.S. AIRWORTHINESS CERTIFICATE

Form Approved O.M.B. No. 2120-0018  
09/30/2007U.S. Department  
of Transportation  
Federal Aviation  
AdministrationAPPLICATION FOR  
U.S. AIRWORTHINESS  
CERTIFICATE

INSTRUCTIONS - Print or type. Do not write in shaded areas; these are for FAA use only. Submit original only to an authorized FAA Representative. If additional space is required, use attachment. For special flight permits complete Sections II, VI and VII as applicable.

I. AIRCRAFT DESIGNATION	1. REGISTRATION MARK	2. AIRCRAFT BUILDER'S NAME (Make)	3. AIRCRAFT MODEL DESIGNATION	4. YR. MFR.	FAA CODING
	N827AU	Aurora Flight Sciences Corp	GoldenEye 50	2006	06100IN
	5. AIRCRAFT SERIAL NO.	6. ENGINE BUILDER'S NAME (Make)	7. ENGINE MODEL DESIGNATION		
	AU-027	Desert Aircraft	DA-50-R		20501
8. NUMBER OF ENGINES	9. PROPELLER BUILDER'S NAME (Make)	10. PROPELLER MODEL DESIGNATION	11. AIRCRAFT IS (Check if applicable)		
1	Aurora Flight Sciences Corp	Aurora Part #GE50-PE712	IMPORT		

APPLICATION IS HEREBY MADE FOR: (Check applicable items)													
A	1	STANDARD AIRWORTHINESS CERTIFICATE (Indicate Category)				NORMAL	UTILITY	ACROBATIC	TRANSPORT	COMMUTER	BALLOON	OTHER	
B	✓	SPECIAL AIRWORTHINESS CERTIFICATE (Check appropriate items)											
II. CERTIFICATION REQUESTED	7	PRIMARY											
	9	LIGHT-SPORT (Indicate Class)											
	2	LIMITED											
	5	PROVISIONAL (Indicate Class)											
		1	CLASS I										
	3	RESTRICTED (Indicate operation(s) to be conducted)											
		1	AGRICULTURE AND PEST CONTROL										
		2	AERIAL SURVEY										
	4	EXPERIMENTAL (Indicate operation(s) to be conducted)											
		1	✓ RESEARCH AND DEVELOPMENT										
		2	AMATEUR BUILT										
		3	EXHIBITION										
	8	SPECIAL FLIGHT PERMIT (Indicate operation(s) to be conducted, then complete Section VI or VII as applicable on reverse side)											
		1	✓ FERRY FLIGHT FOR REPAIRS, ALTERATIONS, MAINTENANCE, OR STORAGE										
		2	EVACUATION FROM AREA OF IMPENDING DANGER										
3		OPERATION IN EXCESS OF MAXIMUM CERTIFICATED TAKE-OFF WEIGHT											
4		DELIVERING OR EXPORTING											
5		PRODUCTION FLIGHT TESTING											

C	6	MULTIPLE AIRWORTHINESS CERTIFICATE (check ABOVE "Restricted Operation" and "Standard" or "Limited" as applicable)										
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III. OWNER'S CERTIFICATION	A. REGISTERED OWNER (As shown on certificate of aircraft registration)											
	NAME: Aurora Flight Sciences Corporation											
	ADDRESS: 9950 Wakeman Drive, Manassas, VA 20110											
	B. AIRCRAFT CERTIFICATION BASIS (Check applicable blocks and complete items as indicated)											
	AIRCRAFT SPECIFICATION OR TYPE CERTIFICATE DATA SHEET (Give No. and Revision No.)											
IV. INSPECTION AGENCY VERIFICATION	AIRCRAFT LISTING (Give page number(s))											
	N/A											
	C. AIRCRAFT OPERATION AND MAINTENANCE RECORDS											
	✓ CHECK IF RECORDS IN COMPLIANCE WITH 14 CFR Section 91.417											
	TOTAL AIRFRAME HOURS: 0.6 hours											
V. FAA REPRESENTATIVE CERTIFICATION	D. CERTIFICATION - I hereby certify that I am the registered owner (or his agent) of the aircraft described above, that the aircraft is registered with the Federal Aviation Administration in accordance with Title 49 of the United States Code 44101 et seq. and applicable Federal Aviation Regulations, and that the aircraft has been inspected and is airworthy and eligible for the airworthiness certificate requested.											
	DATE OF APPLICATION: February 1, 2008											
	NAME AND TITLE (Print or type): Nancy R. Vetere, UAV Flight Operations Manager											
	SIGNATURE: [Signature]											
	A. THE AIRCRAFT DESCRIBED ABOVE HAS BEEN INSPECTED AND FOUND AIRWORTHY BY: (Complete the section only if 14 CFR part 21.183(d) applies.)											
V. FAA REPRESENTATIVE CERTIFICATION	14 CFR part 121 CERTIFICATE HOLDER											
	CERTIFICATED MECHANIC (Give Certificate No.)											
	CERTIFICATED REPAIR STATION (Give Certificate No.)											
	AIRCRAFT MANUFACTURER (Give name or firm)											
	DATE: 2/1/08											
TITLE: Hbg.												
SIGNATURE: [Signature]												
(Check ALL applicable block items A and B)												
A. I find that the aircraft described in Section I or VII meets requirements for												
B. Inspection for a special permit under Section VII was conducted by:												
FAA INSPECTOR												
FAA DESIGNEE												
CERTIFICATE HOLDER UNDER												
14 CFR part 65												
14 CFR part 121 OR 135												
14 CFR part 145												
DATE: 2/1/08												
DISTRICT OFFICE: ANE-MIDO-44												
DESIGNEE'S SIGNATURE AND NO.: HENRY K. COOPER												



VI. PRODUCTION FLIGHT TESTING	A. MANUFACTURER				
	NAME		ADDRESS		
	B. PRODUCTION BASIS (Check applicable item)				
	<div style="display: flex; justify-content: space-between;"> <div style="width: 15%;"></div> <div style="width: 60%;">           PRODUCTION CERTIFICATE (Give production certificate number) <span style="float: right;">→</span> </div> <div style="width: 25%;"></div> </div>				
	TYPE CERTIFICATE ONLY				
	APPROVED PRODUCTION INSPECTION SYSTEM				
C. GIVE QUANTITY OF CERTIFICATES REQUIRED FOR OPERATING NEEDS					
DATE OF APPLICATION		NAME AND TITLE (Print or Type)		SIGNATURE	
VII. SPECIAL FLIGHT PERMIT PURPOSES OTHER THAN PRODUCTION FLIGHT TEST	A. DESCRIPTION OF AIRCRAFT				
	REGISTERED OWNER		ADDRESS		
	BUILDER (Make)		MODEL		
	SERIAL NUMBER		REGISTRATION MARK		
	B. DESCRIPTION OF FLIGHT				
	FROM		TO		
	VIA		DEPARTURE DATE	DURATION	
	C. CREW REQUIRED TO OPERATE THE AIRCRAFT AND ITS EQUIPMENT				
		PILOT	CO-PILOT	FLIGHT ENGINEER	OTHER (Specify)
	D. THE AIRCRAFT DOES NOT MEET THE APPLICABLE AIRWORTHINESS REQUIREMENTS AS FOLLOWS:				
	E. THE FOLLOWING RESTRICTIONS ARE CONSIDERED NECESSARY FOR SAFE OPERATION: (Use attachment if necessary)				
	F. CERTIFICATION - I hereby certify that I am the registered owner (or his agent) of the aircraft described above; that the aircraft is registered with the Federal Aviation Administration in accordance with Title 49 of the United States Code 44101 <u>et seq.</u> , and applicable Federal Aviation Regulations; and that the aircraft has been inspected and is safe for the flight described.				
DATE		NAME AND TITLE (Print or Type)		SIGNATURE	
VIII. AIRWORTHINESS DOCUMENTATION (FAA/DESIGNEE use only)	<input checked="" type="checkbox"/>	A. Operating Limitations and Markings in Compliance with 14 CFR Section 91.9, as applicable.		G. Statement of Conformity, FAA Form 8130-9 (Attach when required)	
	<input checked="" type="checkbox"/>	B. Current Operating Limitations Attached		H. Foreign Airworthiness Certification for Import Aircraft (Attach when required)	
	<input checked="" type="checkbox"/>	C. Data, Drawings, Photographs, etc. (Attach when required)		<input checked="" type="checkbox"/> I. Previous Airworthiness Certificate Issued in Accordance with 14 CFR Section <u>21.191 e, c, f</u> CAR _____ (Original Attached)	
	<input checked="" type="checkbox"/>	D. Current Weight and Balance information Available in Aircraft			
		E. Major Repair and Alteration, FAA Form 337 (Attach when required)		<input checked="" type="checkbox"/> J. Current Airworthiness Certificate Issued in Accordance with 14 CFR Section <u>21.191 e, c, f</u> (Copy Attached)	
	<input checked="" type="checkbox"/>	F. This inspection Recorded in Aircraft Records		K. Light-Sport Aircraft Statement of Compliance, FAA Form 8130-15 (Attach when required)	





UNITED STATES OF AMERICA  
DEPARTMENT OF TRANSPORTATION - FEDERAL AVIATION ADMINISTRATION

# SPECIAL AIRWORTHINESS CERTIFICATE

<b>A</b>	CATEGORY/DESIGNATION <b>EXPERIMENTAL (UNMANNED AIRCRAFT)</b>	
	PURPOSE <b>Research &amp; Development/Air. Survey/Crew Training</b>	
<b>B</b>	MANUFACTURER	NAME <b>N/A</b>
		ADDRESS <b>N/A</b>
<b>C</b>	FLIGHT	FROM <b>N/A</b>
		TO <b>N/A</b>
<b>D</b>	N- <b>827AU</b>	SERIAL NO. <b>AU-027</b>
	BUILDER <b>Aurora Flight Sciences</b>	MODEL <b>GE-50</b>
<b>E</b>	DATE OF ISSUANCE (A) <b>February 1, 2008</b> EXPIRY <b>January 31, 2009</b>	
	OPERATING LIMITATIONS DATED <b>2/1/08</b> ARE PART OF THIS CERTIFICATE	
	SIGNATURE OF FAA REPRESENTATIVE	DESIGNATION OR OFFICE NO.
	<b>Henry K. Cooper</b>	<b>ANE-MIDO-44</b>

Any alteration, reproduction or misuse of this certificate may be punishable by a fine not exceeding \$1,000 or imprisonment not exceeding 3 years, or both. THIS CERTIFICATE MUST BE DISPLAYED IN THE AIRCRAFT IN ACCORDANCE WITH APPLICABLE TITLE 14, CODE OF FEDERAL REGULATIONS (CFR).

<b>A</b>	This airworthiness certificate is issued under the authority of Public Law 104-6, 49 United States Code (USC) 44704 and Title 14 Code of Federal Regulations (CFR).
<b>B</b>	The airworthiness certificate authorizes the manufacturer named on the reverse side to conduct production flight tests, and only production flight tests, of aircraft registered in his name. No person may conduct production flight tests under this certificate: (1) Carrying persons or property for compensation or hire; and/or (2) Carrying persons not essential to the purpose of the flight.
<b>C</b>	This airworthiness certificate authorizes the flight specified on the reverse side for the purpose shown in Block A.
<b>D</b>	This airworthiness certificate certifies that as of the date of issuance, the aircraft to which issued has been inspected and found to meet the requirements of the applicable CFR. The aircraft does not meet the requirements of the applicable comprehensive and detailed airworthiness code as provided by Annex 8 to the Convention On International Civil Aviation. No person may operate the aircraft described on the reverse side: (1) except in accordance with the applicable CFR and in accordance with conditions and limitations which may be prescribed by the Administrator as part of this certificate; (2) over any foreign country without the special permission of that country.
<b>E</b>	Unless sooner surrendered, suspended, or revoked, this airworthiness certificate is effective for the duration and under the conditions prescribed in 14 CFR, Part 21, Section 21.181 or 21.217.

# CANCELLED

UNITED STATES OF AMERICA  
DEPARTMENT OF TRANSPORTATION - FEDERAL AVIATION ADMINISTRATION

02 01 08  
Hbg.

## SPECIAL AIRWORTHINESS CERTIFICATE

ANE-MIDO-44

<b>A</b>	CATEGORY/DESIGNATION EXPERIMENTAL (UNMANNED AIRCRAFT)	
	PURPOSE Research & Development/Market Svy./Crew Training	
<b>B</b>	MANUFACTURER	NAME N/A
		ADDRESS N/A
<b>C</b>	FLIGHT	FROM N/A
		TO N/A
<b>D</b>	N-827AU	SERIAL NO. AU-027
	BUILDER Aurora Flight Sciences	MODEL GE-50
<b>E</b>	DATE OF ISSUANCE December 7, 2007	EXPIRY December 6, 2008
	OPERATING LIMITATIONS DATED 12/07/07	ARE PART OF THIS CERTIFICATE
	SIGNATURE OF FAA REPRESENTATIVE <i>Henry K. Cooper</i> Henry K. Cooper	DESIGNATION OR OFFICE NO. ANE-MIDO-44

Any alteration, reproduction or misuse of this certificate may be punishable by a fine not exceeding \$1,000 or imprisonment not exceeding 3 years, or both. THIS CERTIFICATE MUST BE DISPLAYED IN THE AIRCRAFT IN ACCORDANCE WITH APPLICABLE TITLE 14, CODE OF FEDERAL REGULATIONS (CFR).

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<b>C</b>	This airworthiness certificate authorizes the flight specified on the reverse side for the purpose shown in Block A.
<b>D</b>	This airworthiness certificate certifies that as of the date of issuance, the aircraft to which issued has been inspected and found to meet the requirements of the applicable CFR. The aircraft does not meet the requirements of the applicable comprehensive and detailed airworthiness code as provided by Annex 8 to the Convention On International Civil Aviation. No person may operate the aircraft described on the reverse side: (1) except in accordance with the applicable CFR and in accordance with conditions and limitations which may be prescribed by the Administrator as part of this certificate; (2) over any foreign country without the special permission of that country.
<b>E</b>	Unless sooner surrendered, suspended, or revoked, this airworthiness certificate is effective for the duration and under the conditions prescribed in 14 CFR, Part 21, Section 21.181 or 21.217.



U.S. Department  
of Transportation  
**Federal Aviation  
Administration**

(A) 02/01/08

New Cumberland Manufacturing Inspection District  
Office  
Bldg. 201, Rm. 102,  
400 Airport Drive  
New Cumberland, PA 17070

**EXPERIMENTAL - OPERATING LIMITATIONS**  
**RESEARCH AND DEVELOPMENT, CREW TRAINING, and MARKET SURVEY.**

<b>REGISTERED OWNER NAME:</b> AURORA FLIGHT SCIENCES CORPORATION	<b>AIRCRAFT BUILDER:</b> AURORA FLIGHT SCIENCES CORPORATION
<b>REGISTERED OWNER ADDRESS:</b> 9950 WAKEMAN DRIVE MANASSAS, VA 20110	<b>YEAR MANUFACTURED:</b> 2006
<b>AIRCRAFT DESCRIPTION:</b> DUCTED FAN VTOL	<b>AIRCRAFT SERIAL NUMBER:</b> AU-027
<b>AIRCRAFT REGISTRATION:</b> N827AU	<b>AIRCRAFT MODEL DESIGNATION:</b> GOLDEN EYE 50
	<b>ENGINE MODEL:</b> DESERT AIRCRAFT DA-50-R
	<b>PROPELLER MODEL:</b> CUSTOM 7-BLADE LIFT FAN

**The following conditions and limitations apply to all Aurora Flight Sciences Golden Eye 50, Unmanned Aircraft System flight operations, while operating in the National Airspace System (NAS). These conditions and limitations must be accessible to the pilot in command at all times.**

**1. GENERAL:**

a. For the purposes of this Special Airworthiness Certificate and Operating Limitations, the Golden Eye 50 (GE-50) Unmanned Aircraft System (UAS), owned and operated by Aurora Flight Sciences, is considered to be an integrated system. The system is composed of the GE-50 aircraft, S/N AU-027, UA control station(s) (fixed or mobile), telemetry, navigation and communications equipment to include ground and airborne equipment that is used for control of the GE-50 UA. The ground equipment used for communication with Air Traffic Control during UAS operations is considered part of the UAS.



b. Unless otherwise specified in this document, the UA Pilot-in-Command (PIC) and Aurora shall comply with all applicable sections and parts of 14 CFR including, but not limited to, parts 61 and 91.

c. No person may operate this UA for other than the purpose of Research and Development, Market Survey and/or Crew Training, to accomplish the flight operations outlined in Aurora Flight Sciences Program Letter, Aurora Report Number AR07-139 dated October 3, 2007 which describes compliance with § 21.193(d), and has been made available to the pilot in command of the UA. In addition, this UA must be operated in accordance with applicable air traffic and general operating rules of part 91, and all additional limitations herein prescribed under the provisions of § 91.319(e).

d. The UA PIC must determine that the UA is in a condition for safe operation and in a configuration appropriate for the purpose of the intended flight.

e. No person may operate this UA to carry property for compensation or hire.

f. This UA must be marked with its U.S. Registration number in accordance with 14 CFR part 45 or exemption thereto.

g. This UA must display the word "EXPERIMENTAL" in accordance with § 45.23(b) or exemption thereto.

h. Prior to conducting initial GE-50 flight operations, Aurora must forward an electronic copy of the GE-50 Program Letter, Special Airworthiness Certificate, and Operating Limitations to the following FAA personnel:

1) Lynda Otting, FAA Air Traffic Representative, Eastern Service Center, System Support, 1701 Columbia Ave, College Park, GA 30337, telephone (404) 305-5577, email [lynda.g.otting@faa.gov](mailto:lynda.g.otting@faa.gov).

2) Richard Posey, Aviation Safety Inspector, Production and Airworthiness Division, AIR-200, 800 Independence Ave, SW, Washington, DC 20591, telephone (202) 267-9538, email [richard.posey@faa.gov](mailto:richard.posey@faa.gov).

i. Section 47.45 requires that the FAA Aircraft Registry must be notified within 30 days of any change in the aircraft registrant's address. Such notification is to be made by submitting AC Form 8050-1 to AFS-750 in Oklahoma City, Oklahoma.

**2. PROGRAM LETTER:** The Aurora Flight Sciences Program Letter, Aurora Report Number AR07-139 dated October 3, 2007 shall be used as a basis for the determination of the operating limitations prescribed in this document. All flight operations must be conducted in accordance with the provisions of these operating limitations.

### **3. AUTHORIZED FLIGHT OPERATIONS AREA:**

a. The base of operations for the UA shall be:





(A) 02.01.2008

Flying Circus Aerodrome (3VA3)  
5414 Ritchie Rd  
Bealeton, VA 22712

b. The flight test operations area authorized for the UA at Flying Circus Aerodrome (3VA3) are graphically depicted below. No flights shall exceed 400 feet AGL.

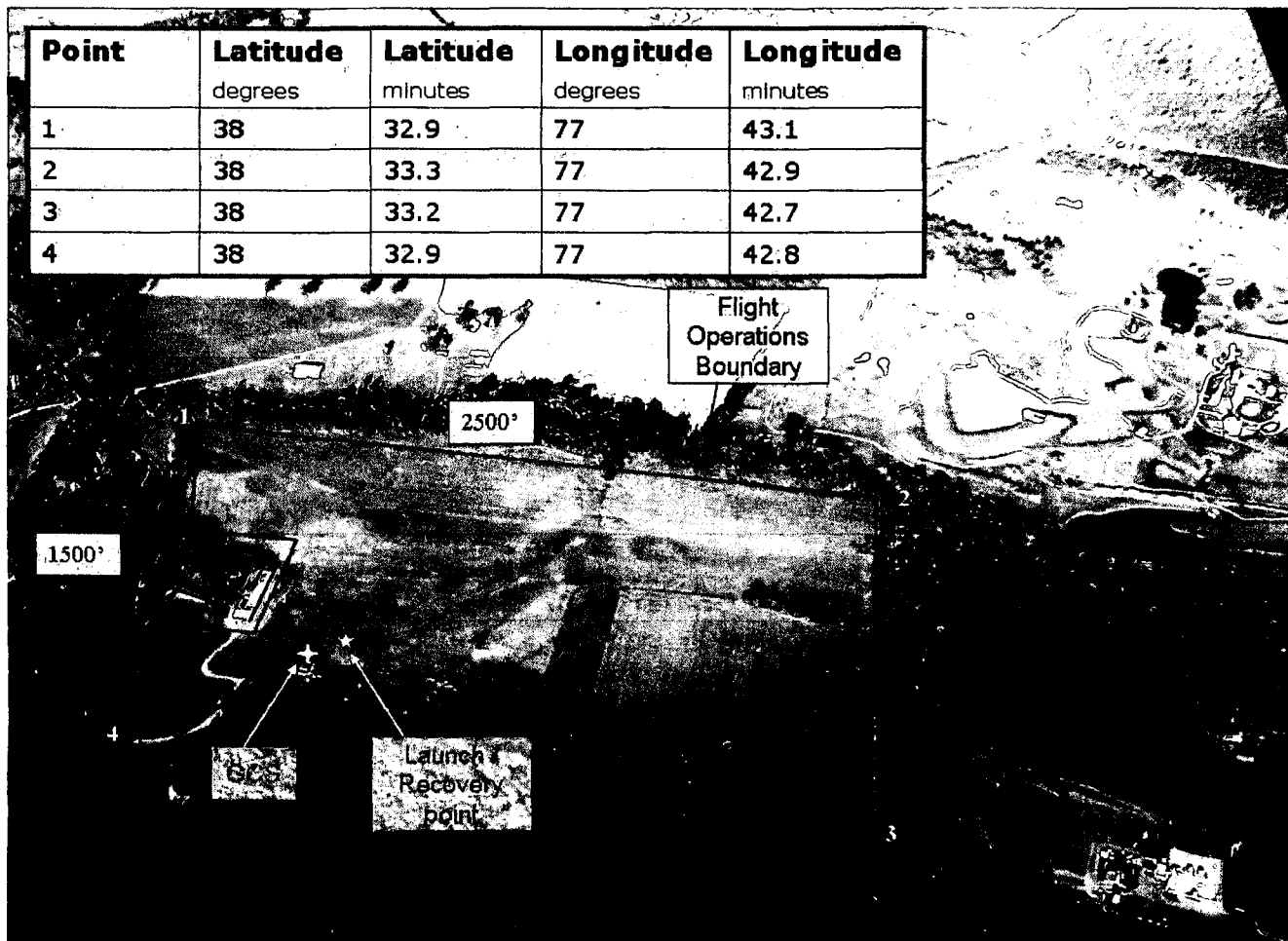


Figure 1. Proposed operations area at Flying Circus Aerodrome

c. Aurora shall notify the airport manager/owner, prior to each operation for coordination with any other potential activity in the vicinity.

d. The UA PIC shall ensure that all UA flight operations remain within the lateral and vertical boundaries of the flight test operations area at The Flying Circus Aerodrome (3AV3). Furthermore, the UA PIC shall take into account all factors that may affect the capability of remaining within the flight test operations area at The Flying Circus Aerodrome (3AV3). This includes, but is not limited to, considerations for wind, gross weight, and glide distances.



e. Incident / Accident Reporting. Any flight operation that transgresses the lateral or vertical boundaries of the flight test operations area at The Flying Circus Aerodrome (3AV3) shall be immediately concluded, and Air Traffic Control notified of the flight status. Any incident or accident, and any flight operation that transgresses the lateral or vertical boundaries of the flight test operations area at The Flying Circus Aerodrome (3AV3) or any Special Use Airspace shall be reported to the FAA Unmanned Aircraft Program Office (UAPO), AIR-160, as soon as practicable, but always within 24 hours. The point of contact to report this information is the Manager of the UAPO, AIR-160, Mr. Doug Davis. Mr. Davis can be reached by phone at 202-385-4636, fax at 202-385-4651, or by e-mail at [Kenneth.d.davis@faa.gov](mailto:Kenneth.d.davis@faa.gov). Accidents shall be reported to the National Transportation Safety Board per instructions contained on the NTSB website: [www.nts.gov](http://www.nts.gov). Further flight operations shall not be conducted until the incident / accident is reviewed by ATO, AFS, and AIR-160, and authorization to resume operations is received.

f. Aircraft operations for the purpose of market survey cannot be performed until after 50 flight hours have been accomplished. A logbook entry is required as evidence of compliance.

#### **4. UA PILOTS and OBSERVERS:**

a. All flight operations shall have a designated UA Pilot-In-Command (PIC). Any additional UA pilot(s) assigned to a crew station during UA flight operations shall be considered a Supplemental UA Pilot. The UA PIC shall have responsibility over each flight conducted and be held accountable for the UA flight operation.

b. The UA PIC is responsible for the safety of the UA as well as persons and property along the UA flight path. This includes, but is not limited to, collision avoidance and the safety of persons and property in the air and on the ground. The UA PIC shall avoid densely populated areas (§ 91.319) and exercise increased vigilance when operating within or in the vicinity of published airway boundaries.

c. The UA PIC shall hold, at a minimum, an FAA Private Pilot certificate, with either an Airplane or Rotorcraft category, Single or Multiengine class ratings, or military equivalent, and have it in his/her possession.

d. The Supplemental Pilot need not be a certificated pilot, but must have successfully completed a recognized Private Pilot ground school and successfully completed the private pilot written test.

e. The UA PIC shall have operational override capability over any Supplemental Pilot, regardless of position.

f. The UA PIC shall maintain currency in manned aircraft in accordance with § 61.57.

g. The UA PIC shall have a Flight Review in manned aircraft every 24 calendar months in accordance with § 61.56.

h. All UA Pilots shall maintain currency in unmanned aircraft in accordance with Aurora GoldenEye-50 Operator Training AR07-102.



i. All UA pilots shall have a Flight Review in unmanned aircraft every 24 calendar months in accordance with Aurora company procedures.

j. All flight operations conducted shall have an Observer to perform traffic avoidance and visual observation to fulfill the "see and avoid" requirement of § 91.113.

k. All Observers shall:

1) Hold at a minimum, an FAA Private Pilot certificate or military equivalent (an Observer does not require currency as a pilot); or,

2) In lieu of a Pilot certificate, have successfully completed specific Observer training acceptable to the FAA.

l. The UA PIC and Observer(s) must have in their possession a valid third class (or higher) airman medical certificate that has been issued under 14 CFR part 67.

m. UA Pilots and Observers shall perform crew duties for only one UA at a time.

n. All Observers must be thoroughly trained, familiar with, and possess, operational experience with the equipment being utilized for observation and detection of other aircraft for collision avoidance purposes as outlined in the Aurora Program Letter.

o. Observer Responsibilities: The task of the Observer is to provide the UA pilot(s) with instructions to maneuver the UA clear of any potential collision with other traffic. Observer duties require continuous visual contact with the UA at all times in such a manner as to be able to discern UA attitude and trajectory in relation to conflicting traffic. At no time shall Observers conduct their duties more than 1300 feet laterally or 400 feet vertically from the UA.

## **5. COMMUNICATIONS:**

a. Appropriate Air Traffic frequencies shall be monitored during flight operations.

b. All UAS crew positions must maintain two-way communications with each other during all operations. If unable to maintain two-way communication, the UA will be expeditiously returned to its base of operations while remaining within the Primary Containment Area, and conclude the flight operation.

c. Spectrum used for operation and control of the UA must be approved by the Federal Communications Commission or other appropriate government oversight agency prior to operations being conducted.

## **6. FLIGHT CONDITIONS:**

a. All flight operations must be conducted during daylight hours in visual meteorological conditions (VMC), including cloud clearance minimums as specified in § 91.155. Flight operation in instrument meteorological conditions (IMC) is not permitted.



b. The UA is prohibited from aerobatic flight, that is, an intentional maneuver involving an abrupt change in the UA's attitude, an abnormal acceleration, or other flight action not necessary for normal flight (§ 91.303).

c. Flight operations must not involve carrying hazardous material or the dropping of any objects or external stores.

d. The UA and shall be equipped with operable strobe/anti-collision lights and shall be illuminated during operations.

e. Aurora Flight Sciences must request the issuance of a Notice to Airman (NOTAM) through the local Automated Flight Service Station at least twenty-four 24 hours prior to flight operation.

## **7. FLIGHT TERMINATION & LOST LINK PROCEDURES:**

a. In accordance with Aurora Flight Sciences Program Letter, Aurora Report Number AR07-139 dated October 3, 2007, flight termination must be initiated at any point that safe operation of the UA cannot be maintained.

b. In the event of lost link, the UA must provide a means of automatic recovery that ensures airborne operations are predictable and that the UA remains within the flight test area. The observer will be immediately notified of the lost link condition and the expected UA response.

## **8. MAINTENANCE:**

a. The GE-50 UAS must not be operated unless it is inspected and maintained in accordance with the GE-50 Preflight Inspection report AR07-069A, and the GE-50 Postflight Inspection report AR07-070A both dated July 26, 2007, or later FAA-accepted revision. Maintenance must be recorded in the UAS maintenance records.

b. No person may operate this UAS unless within the preceding 12 calendar months it has had a condition inspection performed in accordance with, FAA-accepted, GE-50 Preflight Inspection report AR07-069A, and the GE-50 Postflight Inspection report AR07-070A both dated July 26, 2007, and was found to be in a condition for safe operation. This inspection will be recorded in the UAS maintenance records.

c. Only those individuals authorized by Aurora Flight Sciences, and acceptable to the FAA, may perform inspections required by these operating limitations.

d. Inspections of the UAS must be recorded in the UAS maintenance records showing the following, or a similarly worded, statement: "I certify that this UAS has been inspected on [insert date] in accordance with the scope and detail of the GE-50 Preflight Inspection report AR07-069A, and the GE-50 Postflight Inspection report AR07-070A both dated July 26, 2007." The entry will include the UAS's total time-in-service, and the name and signature of the person performing the inspection and the date the inspection was performed.





e. UAS instruments and equipment installed must be inspected and maintained in accordance with the requirements of the GE-50 Preflight Inspection report AR07-069A, and the GE-50 Postflight Inspection report AR07-070A both dated July 26, 2007. Any maintenance or inspection of this equipment must be recorded in the UAS maintenance records.

## **9. EQUIPAGE:**

The GE-50 Ground Control Station shall be equipped with two-way communications equipment allowing for communications between the UA pilot and Air Traffic Control.

## **10. INFORMATION REPORTING**

Aurora Flight Sciences shall provide the following information to Donald E Grampp@faa.gov, AIR-200 on a monthly basis.

- a. Number of flights conducted under this certificate.
- b. Pilot duty time per flight.
- c. Unusual equipment malfunctions (hardware or software), if any.
- d. Deviations from ATC instructions.
- e. Unintended entry into lost link flight mode that results in a course change.

## **11. REVISIONS**

a. The experimental certificate, Aurora Flight Sciences FAA-accepted program letter, and operating limitations cannot be reissued, renewed, or revised without first notifying the Production and Airworthiness Division, AIR-200 and application being made to the New Cumberland MIDO. AIR-200 will be responsible for headquarters internal coordination with the Aircraft Certification Service, Flight Standards Service, Air Traffic, Office of Chief Council, and Office of Rulemaking.

b. No Certificate of Authorization or Waiver may be issued in association with this Experimental Certificate unless it is coordinated with AIR-200.

c. The provisions and limitations annotated in this operational approval may be amended or cancelled at any time as deemed necessary by the FAA.

d. All revisions to Aurora FAA-accepted GE-50 Preflight Inspection report AR07-069A, and the GE-50 Postflight Inspection report AR07-070A both dated July 26, 2007, or later FAA-accepted revision must be reviewed and accepted by the Washington Flight Standards District Office.

## **12. UA MODIFICATIONS**

a. All software and system changes will be documented as part of the normal maintenance procedures and be available for inspection. All software and system changes shall be inspected and approved per Aurora's maintenance procedures. All software changes to the aircraft and GCS are categorized as major changes, and shall be provided in summary form at the time they are incorporated.

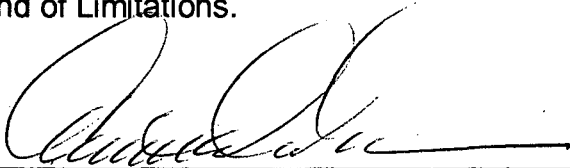


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b. All major modifications, whether performed under the experimental certificate, COA, or other authorizations, that could potentially effect the safe operation of the system, shall be documented and shall be provided to the FAA prior to operating the aircraft under this certificate. Major modifications incorporated under COA or other authorization need only be provided if the aircraft is flown under these authorizations during the effective period of the experimental certificate.

c. All information requested shall be provided to AIR-200.

End of Limitations.



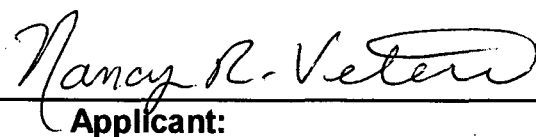
Henry K. Cooper  
Senior Aviation Safety Inspector  
New Cumberland Manufacturing Inspection District Office  
Bldg. 201, Rm. 102,  
400 Airport Road  
New Cumberland, PA 17070-3419

Issuance Date (Amended):  
**February 1, 2008**

**The Special Airworthiness Certificate and accompanying Operating Limitations expire on**

**I certify that I have read and understand the operating limitations, and conditions, that are a part of the Special Airworthiness Certificate; FAA Form 8130-7 issued on for the purposes of Research and Development, Market Survey and/or Crew Training.**

**This Special Airworthiness Certificate is issued for the Aurora Flight Sciences Systems, UA model "GE-50," serial number AU-027, registration number N827AU.**



Applicant:

Date: February 1, 2008

**Name: Nancy R. Vetere**

**Title: UAV Flight Operations Manager**

**Company: Aurora Flight Sciences**





**GoldenEye-50**

**Program Letter  
for  
Experimental Certification of N827AU  
(Flying Circus Aerodrome, Bealeton, VA)**

Prepared for  
Federal Aviation Administration

Contract Number: N/A

Aurora Report Number: AR07-139

October 3, 2007

Prepared by  
Aurora Flight Sciences Corporation  
9950 Wakeman Drive  
Manassas, Virginia 20110

[www.aurora.aero](http://www.aurora.aero)



## PROGRAM LETTER FOR UNMANNED AIRCRAFT SYSTEMS

REGISTERED OWNER NAME:	AURORA FLIGHT SCIENCES CORPORATION
AIRCRAFT BUILDER:	AURORA FLIGHT SCIENCES CORPORATION
REGISTERED OWNER ADDRESS:	9950 WAKEMAN DRIVE MANASSAS, VA 20110
YEAR MANUFACTURED:	2006
AIRCRAFT DESCRIPTION:	DUCTED FAN VTOL UNMANNED AERIAL VEHICLE
AIRCRAFT SERIAL NUMBER:	AU-027
AIRCRAFT REGISTRATION:	N827AU
AIRCRAFT MODEL DESIGNATION:	GOLDENEYE 50 (GE-50)
ENGINE MODEL:	DESERT AIRCRAFT DA-50-R SINGLE-CYLINDER 2-CYCLE ENGINE
PROPELLER MODEL:	CUSTOM 7-BLADE LIFT FAN

**1. DEFINE THE EXPERIMENTAL PURPOSE(S) UNDER WHICH THE AIRCRAFT IS TO BE OPERATED (14 CFR § 21.191).**

In accordance with the above referenced regulation, Aurora Flight Sciences will operate the GoldenEye unmanned aerial vehicles for the purpose of research and development, crew training, and market surveys.

**2. DESCRIBE THE PURPOSE/SCOPE OF THE EXPERIMENTAL PROGRAM FOR EACH 14 CFR § 21.191 EXPERIMENTAL PURPOSE SOUGHT (14 CFR §§ 21.193(b)(d)).**

(1) Research and development – Aurora will fly the experimental GoldenEye vehicle to flight test the vehicle and to expand the flight envelope.

(2) Crew Training – Aurora will fly the vehicles as part of the company's training program to qualify crewmembers to operate the vehicles and to increase flying proficiency.

(3) Market Surveys – Aurora will fly the vehicle for sales demonstrations for potential customers.

**3. DEFINE THE AREA(S) IN WHICH THE EXPERIMENTAL FLIGHTS WILL BE CONDUCTED.**

**a. Describe the areas over which the flights are to be conducted and address of base operation (14 CFR § 21.193(d)(3)).**

Flights will be conducted at Flying Circus Aerodrome, Bealeton, VA

**b. Identify all proposed flight areas using latitude and longitude on aeronautical maps.**

Flying Circus Aerodrome Bealeton, VA – Identifier 3VA3

POINT	LATITUDE degrees	LATITUDE minutes	LONGITUDE degrees	LONGITUDE minutes
1	38	32.9	77	43.1
2	38	33.3	77	42.9
3	38	33.2	77	42.7
4	38	32.9	77	42.8

**Note: The coordinates listed in the above table correspond to Waypoints 1 through 4 in Figure 1 below.**



**FIGURE (1) Flying Circus Aerodrome, Bealeton, Va**

- a. Include information on airspeed, altitude, number of flight hours, number of flights and program duration for each test flight area.**

Airport/ Area	Airspeed Max	Altitude Max	Flight Hours (estimated)	# of Flights (estimated)	Program Duration
3VA3 (Bealeton)	60 kts	400 AGL	125	250	1 year

- b. What class of airspace will be used?**

Aurora expects flying to occur in Class G airspace.



**c. Will minimum fuel requirements of 14 CFR § 91.151 be met?**

Fuel burn is a precisely monitored flight test parameter. Current operations typically take place in a very small geographic area under visual conditions where immediate landing is possible, eliminating the need to fly an additional 30 or 45 minutes to find a suitable landing site.

**d. Will flight-testing include payload testing?**

Yes. The current vehicle payload is an E/O camera. Flight testing may include the testing of other payloads, except weaponized payloads are not expected to be tested.

**e. What considerations need to be taken with regard to payloads?**

None.

**f. Will the aircraft perform any aerobatic maneuvers?**

The vehicle does not perform aerobatic maneuvers. In addition to forward flight on the wing, flight maneuvers for the GoldenEye 50 vehicle include vertical takeoff and landing, hover flight, horizontal flight in the hover mode, turns about the vertical axis, and climbs and descents.

**g. Flight Conditions (e.g., VFR, IFR, VMS, etc.)**

VFR

**4. AIRCRAFT CONFIGURATION. Attach three-view drawings or three-view dimensioned photographs of the aircraft (14 CFR § 21.193(b)(4)). Describe Unmanned Aircraft System configuration including ground control station. Include a description of aircraft/system performance characteristics including:**

See Figures (1 and 2) at the end of this document.

Aircraft system configuration is a ducted fan with torsionally disconnected "free wings". The engine for the GE-50 engine and propeller is enclosed in the fuselage.

The Ground control station consists of a laptop computer with proprietary software. It is connected to a datalink antenna. The ground control station (GCS) communicates with the air vehicle by means of a 900 MHz datalink. Payload imagery is sent from the aircraft to the GCS over a separate 2.4 GHz datalink. Flight commands and vehicle flight reports are up- and downlinked via the datalink. Vehicle state and health information is reported on the GCS laptop display to the air vehicle operator.

GoldenEye-50	
a. Wing span	4.4 feet
b. Length	2.9 feet
c. Powerplant	Desert Aircraft DA-50 single-cylinder 2-cycle engine
d. Max gross take off weight	21 lbs
e. Fuel capacity	30 fluid oz
f. Payload capacity	2 lbs
g. Max altitude	5000 feet
h. Endurance	20 minutes
i. Max airspeed	40 kts
j. Control/data frequencies	900MHz frequency-hopping spread- spectrum (command & control) 2.4GHz (payload data)
k. Guidance and navigation control	GuideStar computer (Athena Technologies Inc)

## 5. INSPECTION AND MAINTENANCE (14 CFR Part 91 Subpart E).

- a. Describe the inspection and maintenance program that will be used to maintain the aircraft and related systems (includes ground stations and/or other support systems).**

Due to the current phase of the GE-50 program, inspection and maintenance program is currently a continuous maintenance program rather than one based on periodic inspections. Aurora maintenance procedures include thorough pre-flight and post-flight checklists which cover all systems. Maintenance is also performed on the vehicle between flights. These checklists have been previously approved during the certification of the first GE-50, N828AU.

- b. Provide copy of flight manual, if applicable, current weight and balance report, equipment list.**

The GE-50 Standard Operating Procedures have been previously provided to the FAA. Weight and balance information for this specific vehicle, N827AU, will be provided for review.

## 6. PILOT QUALIFICATION (14 CFR §§ 61.3, 61.5).

- 1. Describe the qualifications for each pilot.**

Flights are supervised by at least one FAA certificated pilot. Aurora UAV operators have previous UAV experience through either commercial and/or military operations and many have been involved in the system design and



development. All crewmembers undergo an Aurora qualification program. Additional crewmembers may be trained throughout the year.

Aurora Crewmember	Qualifications
Flight Director (PIC)	Airline Transport Pilot License Aurora trained GE50 flight director (PIC)
Operator (Supplemental Pilot)	Prior Military UAV Instructor Pilot Aurora trained operator
Operator (Supplemental Pilot)	GE50 Technician Aurora trained operator
Crew Chief	Aurora trained crew chief
Trainee	Prior Military UAV Standardization Instructor Pilot Aurora operator in training
Trainee	Private Pilot License, Aurora operator and flight director in training
Trainee	Aurora operator in training

***b. Pilots must be qualified/certificated in the appropriate type of aircraft, i.e., rotorcraft, powered lift, fixed wing, etc.***

Not applicable

***c. Describe internal training program to qualify pilots.***

Aurora's internal program consists of a company taught ground instruction, simulator training, ground and flight operations observation, and actual flight training under the supervision of an experienced UAV operator/instructor.

***d. Describe the qualifications and training of observers.***

Observers are Aurora trained and are knowledgeable on our operations and applicable flight rules.

**7. AIRCRAFT MARKING (14 CFR Part 45). All Unmanned Aircraft System (UAS) are required to be registered and identified with the registration number. Aircraft must be marked in accordance with part 45.**

Aircraft (N827AU) markings will be IAW FAA direction received during the certification of N828AU.



**8. ATC TRANSPONDER AND ALTITUDE REPORTING SYSTEM EQUIPMENT AND USE (14 CFR § 91.215). Describe the aircraft altitude reporting system.**

There is no transponder on Aurora GoldenEye vehicles.

**9. METHOD FOR SEE AND AVOID (14 CFR 91.113a). In what manner, or by what means, will the requirement to "see and avoid" other aircraft be met? What performance will the chase plan have?**

See and avoid capability is provided by the flight crew on the ground. Currently, the vehicle is maintained in line of sight at all times. The flight crew, complemented by range safety observers, scans the operations area for potential traffic conflicts and executes appropriate avoidance maneuvers if required. Aurora does not currently use a chase plane for GoldenEye flights.

**10. SAFETY RISK MANAGEMENT. An applicant must provide a safety checklist that identifies and analyzes the hazards of UAS operations that are described in the program letter. Additional information is available by contacting the FAA Aviation Safety Inspector. A completed Safety Checklist for the GE-50 system has been submitted under separate cover to the FAA.**

**11. SYSTEM CONFIGURATION. Provide a description of aircraft system configuration and all on-board and ground-based equipment.**

GoldenEye-50	
On-board equipment	<ul style="list-style-type: none"><li>• Desert Aircraft DA-50 single-cylinder 2-cycle engine</li><li>• Athena Technologies flight controls computer</li><li>• 900MHz communications radio &amp; antenna</li><li>• E/O camera</li><li>• 2.4GHz video transmitter &amp; antenna</li></ul>
Ground-based equipment	<ul style="list-style-type: none"><li>• GCS laptop computer</li><li>• 900MHz radio for command &amp; control, with antenna</li><li>• 2.4GHz video receiver &amp; antenna</li><li>• Optional second display case for engineering data and/or payload video</li><li>• Strap-down platform for pre-launch run-up checks</li><li>• Starter</li><li>• Ground power / charger unit</li></ul>

**12. SYSTEM SAFETY - FLIGHT TERMINATION AND LOST LINK. What is the expectation of aircraft "Flight" if fuel is starved? Briefly describe/explain aircraft lost link and emergency recovery procedures. Provide a brief explanation of the flight termination system (FTS).**

Like most VTOL aircraft, GoldenEye aircraft do not glide. If fuel is starved, the vehicle will descend almost vertically. If the communications uplink is lost, the vehicle will hover in place and then enter a vertical auto-land. Future software loads on the GoldenEye-50 may include the ability to climb or descend to a specified altitude, turn to a specified heading, and/or return to a specified waypoint (such as the takeoff location).

The GE-50 has a "kill" command that may be issued by the flight crew. This command shuts down the aircraft's propulsion system, which will put the aircraft into a vertical descent and crash-landing.

**13. COMMAND AND CONTROL. Provide a brief description of the system and/or procedures for command and control of the UAS.**

GoldenEye-50 is operated using a touch screen laptop for command and control. The vehicle can be operated manually, in which the operator specifies direction of flight (forward, backward, left, right) and groundspeed, altitude and climb rate. Mission Scripts (plans) can also be uploaded prior to flight. These plans may include waypoint navigation, altitude changes, groundspeed changes, etc.

The vehicle is launched and recovered via one-button "takeoff" and "land" commands from the GCS. "Takeoff" directs the airplane to launch vertically and climb to a specified altitude, then hover in place until additional commands are received from the ground control station. "Land" directs the airplane to descend vertically until the ground sensors trigger, at which time the engine shuts down and the flight controls system is shutdown.

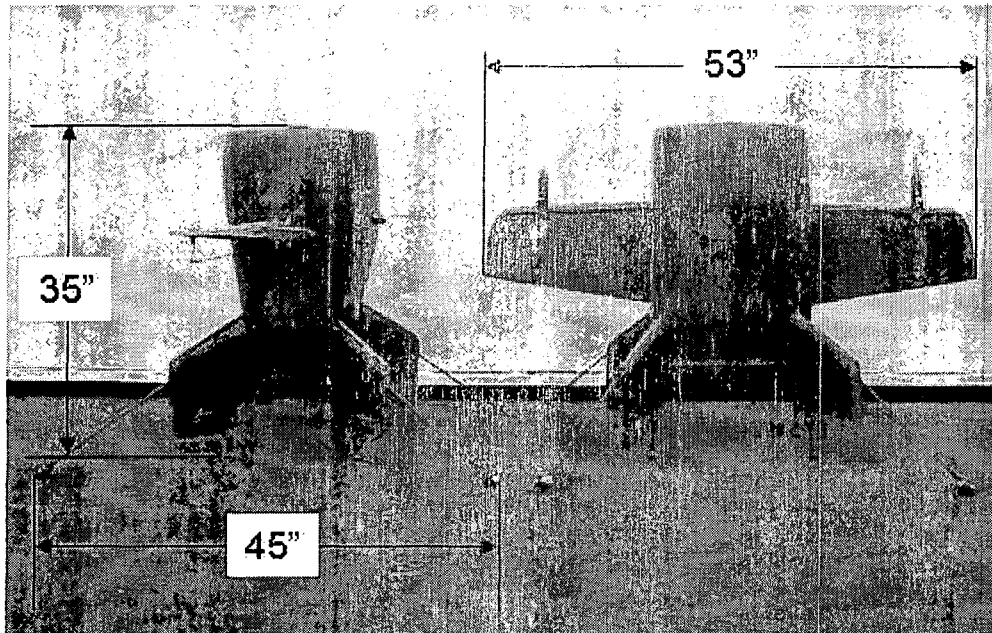
The vehicle will be operated in accordance with Aurora Report AR-07-068A, GoldenEye-50 Standard Operating Procedures, dated July 24, 2007.

**14. CONTROL STATIONS. Provide a brief description of the ground/airborne stations used to control the UAS.**

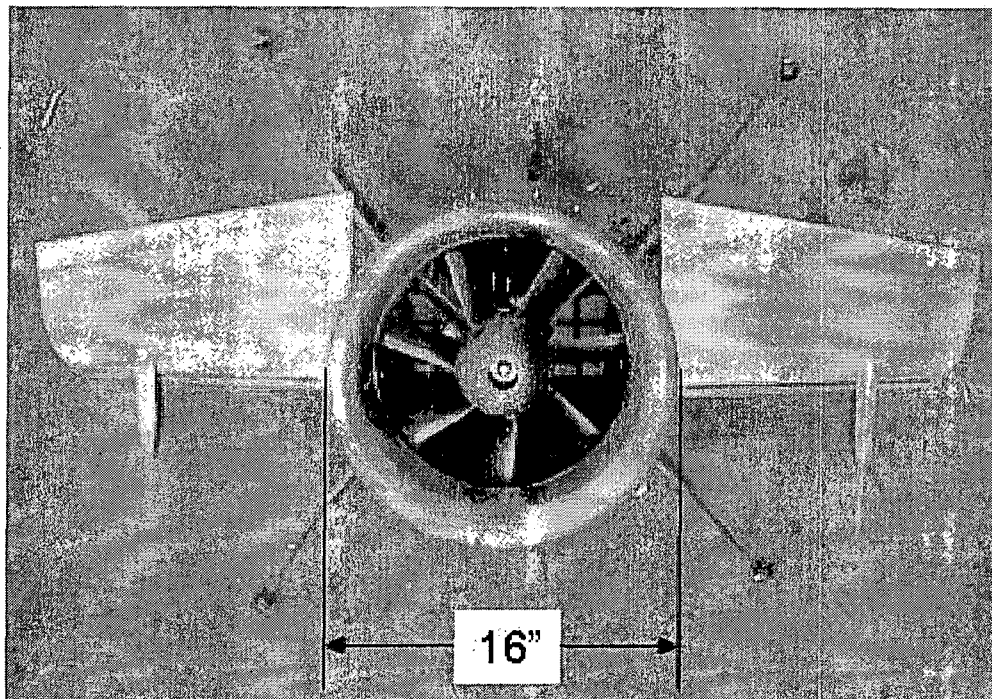
The GE50 system utilizes a computer for the ground control station. The laptop computer and the communications radios and antennas may be mounted in a vehicle or as a tabletop/handheld setup. There is also an additional computer that is sometimes used for additional data collection and system monitoring, but does not provide command and control capability.

**15. CONTROL FREQUENCIES. Provide a description/listing of the frequencies used to control the UAS.**

- 900 MHz (command and control)
- 2.4 GHz (payload video data, not used for control)



**FIGURE (2) – GE-50 Side and Bottom View**



**FIGURE (3) – GE-50 Front View**

## AIRCRAFT MAINTENANCE DISCREPANCY/WORK RECORD

Date	From Mo. Day Yr <u>1/31/08</u>	To Mo. Day Yr	Organization <u>Aurora</u>	Model <u>GE50</u>	Serial Number <u>027</u>	Insp Verify Page Complete	Page No. <u>8</u>
------	-----------------------------------	---------------	-------------------------------	----------------------	-----------------------------	------------------------------	----------------------

Sym	Date Disc	Discrepancy	Corrective Action
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I certify that this UAS has been inspected on 1/31/08 in accordance with the scope and detail of the GE-50 Preflight Inspection report AR07-069A, and the GE-50 Postflight Inspection report AR07-070A both dated July 26, 2007 and was found to be in condition for safe operation. Total time-in-service 0.6.

Name J. Pennington Date 1/31/08

I HAVE DETERMINED THIS AIRCRAFT TO HAVE BEEN INSPECTED FOR ADDITIONAL FOR THE CERTIFICATE REQUESTED, AND THAT HAS BEEN FOUND TO BE IN A CONDITION FOR SAFE OPERATION. ISSUED FAA FORM 8130-7 & OPERATING LIMITATIONS DATED 2/1/08.

*[Signature]*

	Discovered By	Corrected By	Date	Inspected By
--	---------------	--------------	------	--------------

Sym	Date Disc	Discrepancy	Corrective Action
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	Discovered By	Corrected By	Date	Inspected By
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Sym	Date Disc	Discrepancy	Corrective Action
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	Discovered By	Corrected By	Date	Inspected By
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Sym	Date Disc	Discrepancy	Corrective Action
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	Discovered By	Corrected By	Date	Inspected By
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U.S. Department  
of Transportation  
**Federal Aviation  
Administration**

New Cumberland Manufacturing Inspection District Office  
Bldg. 201, Rm. 102,  
400 Airport Drive  
New Cumberland, PA 17070

**CANCELLED**

02 01 08

ANE-MIDO-44

**EXPERIMENTAL - OPERATING LIMITATIONS**  
**RESEARCH AND DEVELOPMENT, CREW TRAINING, and MARKET SURVEY.**

<b>REGISTERED OWNER NAME:</b> AURORA FLIGHT SCIENCES CORPORATION	<b>AIRCRAFT BUILDER:</b> AURORA FLIGHT SCIENCES CORPORATION
<b>REGISTERED OWNER ADDRESS:</b> 9950 WAKEMAN DRIVE MANASSAS, VA 20110	<b>YEAR MANUFACTURED:</b> 2006
<b>AIRCRAFT DESCRIPTION:</b> DUCTED FAN VTOL	<b>AIRCRAFT SERIAL NUMBER:</b> AU-027
<b>AIRCRAFT REGISTRATION:</b> N827AU	<b>AIRCRAFT MODEL DESIGNATION:</b> GOLDEN EYE 50
	<b>ENGINE MODEL:</b> DESERT AIRCRAFT DA-50-R
	<b>PROPELLER MODEL:</b> CUSTOM 7-BLADE LIFT FAN

**The following conditions and limitations apply to all Aurora Flight Sciences Golden Eye 50, Unmanned Aircraft System flight operations, while operating in the National Airspace System (NAS). These conditions and limitations must be accessible to the pilot in command at all times.**

**1. GENERAL:**

a. For the purposes of this Special Airworthiness Certificate and Operating Limitations, the Golden Eye 50 (GE-50) Unmanned Aircraft System (UAS), owned and operated by Aurora Flight Sciences, is considered to be an integrated system. The system is composed of the GE-50 aircraft, S/N AU-027, UA control station(s) (fixed or mobile), telemetry, navigation and communications equipment to include ground and airborne equipment that is used for control of the GE-50 UA. The ground equipment used for communication with Air Traffic Control during UAS operations is considered part of the UAS.



b. Unless otherwise specified in this document, the UA Pilot-in-Command (PIC) and Aurora shall comply with all applicable sections and parts of 14 CFR including, but not limited to, parts 61 and 91.

c. No person may operate this UA for other than the purpose of Research and Development, Market Survey and/or Crew Training, to accomplish the flight operations outlined in Aurora Flight Sciences Program Letter, Aurora Report Number AR07-139 dated October 3, 2007 which describes compliance with § 21.193(d), and has been made available to the pilot in command of the UA. In addition, this UA must be operated in accordance with applicable air traffic and general operating rules of part 91, and all additional limitations herein prescribed under the provisions of § 91.319(e).

d. The UA PIC must determine that the UA is in a condition for safe operation and in a configuration appropriate for the purpose of the intended flight.

e. No person may operate this UA to carry property for compensation or hire.

f. This UA must be marked with its U.S. Registration number in accordance with 14 CFR part 45 or exemption thereto.

g. This UA must display the word "EXPERIMENTAL" in accordance with § 45.23(b) or exemption thereto.

h. Prior to conducting initial GE-50 flight operations, Aurora must forward an electronic copy of the GE-50 Program Letter, Special Airworthiness Certificate, and Operating Limitations to: Lynda Otting, FAA Air Traffic Representative, Eastern Service Center, System Support, 1701 Columbia Ave, College Park, GA 30337, telephone (404) 305-5577, email Lynda.G.Otting@faa.gov.

i. Section 47.45 requires that the FAA Aircraft Registry must be notified within 30 days of any change in the aircraft registrant's address. Such notification is to be made by submitting AC Form 8050-1 to AFS-750 in Oklahoma City, Oklahoma.

**2. PROGRAM LETTER:** The Aurora Flight Sciences Program Letter, Aurora Report Number AR07-139 dated October 3, 2007 shall be used as a basis for the determination of the operating limitations prescribed in this document. All flight operations must be conducted in accordance with the provisions of these operating limitations.

### **3. AUTHORIZED FLIGHT OPERATIONS AREA:**

a. The base of operations for the UA shall be:

Flying Circus Aerodrome (3VA3)  
5414 Ritchie Rd  
Beaeton, VA 22712

b. The flight test operations area authorized for the UA at Flying Circus Aerodrome (3VA3) are graphically depicted below.



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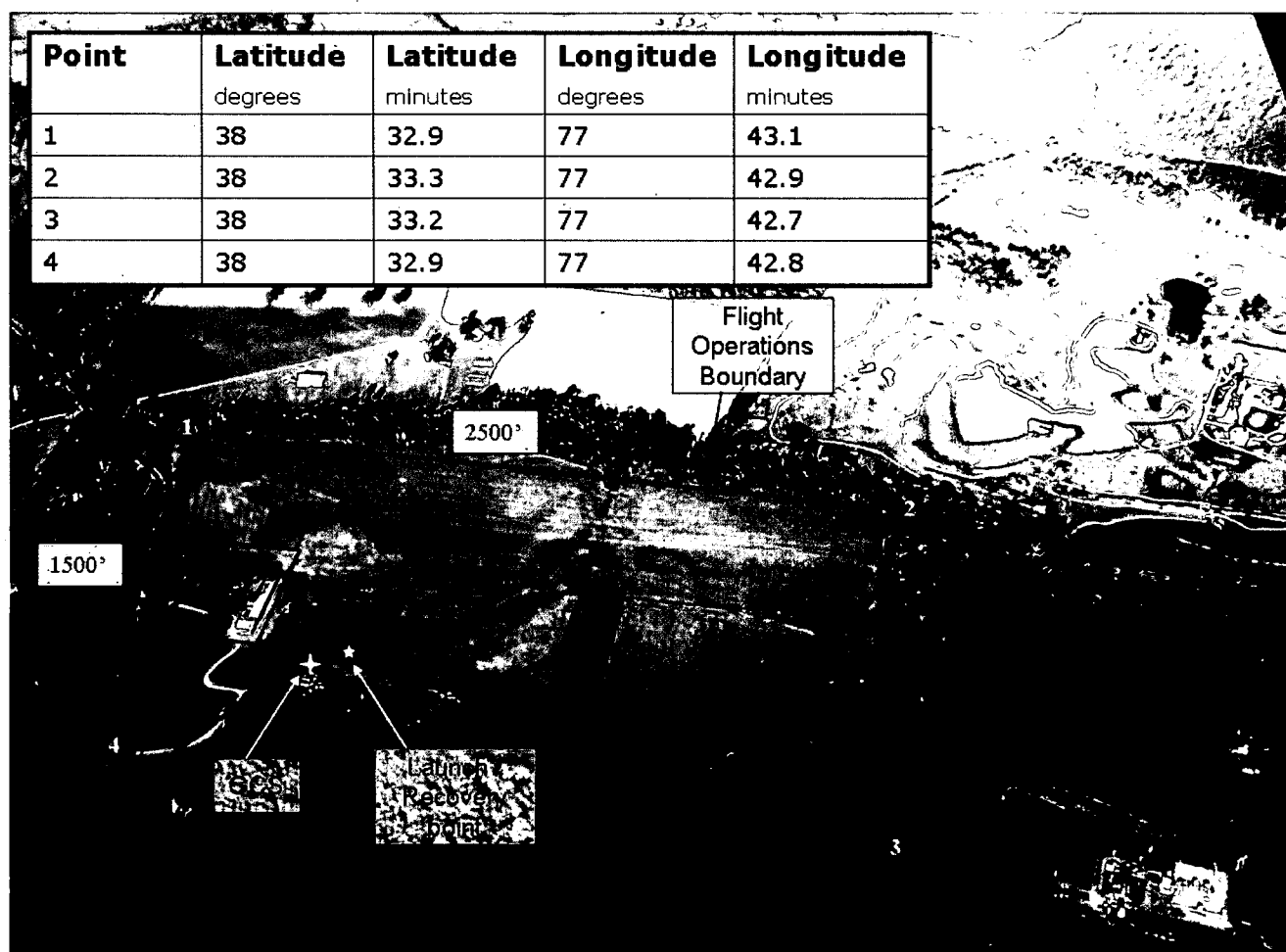


Figure 1. Proposed operations area at Flying Circus Aerodrome

c. Aurora shall notify the airport manager/owner, prior each operation, for coordination with any other potential activity in the vicinity.

d. The UA PIC shall ensure that all UA flight operations remain within the lateral and vertical boundaries of the flight test operations area at The Flying Circus Aerodrome (3AV3). Furthermore, the UA PIC shall take into account all factors that may affect the capability of remaining within the flight test operations area at The Flying Circus Aerodrome (3AV3). This includes, but is not limited to, considerations for wind, gross weight, and glide distances.

e. Any flight operation that transgresses the lateral or vertical boundaries of the flight test operations area at shall be immediately concluded, and Air Traffic Control notified of the flight status. Aurora shall, at the conclusion of the flight, immediately notify the Manager of the Unmanned Aircraft Program Office AIR-160, of any flight operation that transgresses the lateral or vertical boundaries of the flight test operations area at The Flying Circus Aerodrome (3AV3). The point of contact is Mr. Doug Davis. Mr. Davis can be reached at 202-385-4636 or email [kenneth.d.davis@faa.gov](mailto:kenneth.d.davis@faa.gov).



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f. Further flight operations shall not be conducted until the incident is reviewed by AIR-160, and authorization to resume operations is received.

g. Aircraft operations for the purpose of market survey cannot be performed until after 50 flight hours have been accomplished. A logbook entry is required as evidence of compliance.

#### **4. UA PILOTS and OBSERVERS:**

a. All flight operations shall have a designated UA Pilot-In-Command (PIC). Any additional UA pilot(s) assigned to a crew station during UA flight operations shall be considered a Supplemental UA Pilot. The UA PIC shall have responsibility over each flight conducted and be held accountable for the UA flight operation.

b. The UA PIC is responsible for the safety of the UA as well as persons and property along the UA flight path. This includes, but is not limited to, collision avoidance and the safety of persons and property in the air and on the ground. The UA PIC shall avoid densely populated areas (§ 91.319) and exercise increased vigilance when operating within or in the vicinity of published airway boundaries.

c. The UA PIC shall hold, at a minimum, an FAA Private Pilot certificate, with either an Airplane or Rotorcraft category, Single or Multiengine class ratings, or military equivalent, and have it in his/her possession.

d. The Supplemental Pilot need not be a certificated pilot, but must have successfully completed a recognized Private Pilot ground school and successfully completed the private pilot written test.

e. The UA PIC shall have operational override capability over any Supplemental Pilot, regardless of position.

f. The UA PIC shall maintain currency in manned aircraft in accordance with § 61.57.

g. The UA PIC shall have a Flight Review in manned aircraft every 24 calendar months in accordance with § 61.56.

h. All UA Pilots shall maintain currency in unmanned aircraft in accordance with Aurora GoldenEye-50 Operator Training AR07-102.

i. All UA pilots shall have a Flight Review in unmanned aircraft every 24 calendar months in accordance with Aurora company procedures.

j. All flight operations conducted shall have an Observer to perform traffic avoidance and visual observation to fulfill the "see and avoid" requirement of § 91.113.





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k. All Observers shall:

1) Hold at a minimum, an FAA Private Pilot certificate or military equivalent (an Observer does not require currency as a pilot); or,

2) In lieu of a Pilot certificate, have successfully completed specific Observer training acceptable to the FAA.

l. The UA PIC and Observer(s) must have in their possession a valid third class (or higher) airman medical certificate that has been issued under 14 CFR part 67.

m. UA Pilots and Observers shall perform crew duties for only one UA at a time.

n. All Observers must be thoroughly trained, familiar with, and possess, operational experience with the equipment being utilized for observation and detection of other aircraft for collision avoidance purposes as outlined in the Aurora Program Letter.

o. Observer Responsibilities: The task of the Observer is to provide the UA pilot(s) with instructions to maneuver the UA clear of any potential collision with other traffic. Observer duties require continuous visual contact with the UA at all times in such a manner as to be able to discern UA attitude and trajectory in relation to conflicting traffic. At no time shall Observers conduct their duties more than 1300 feet laterally or 400 feet vertically from the UA.

## **5. COMMUNICATIONS:**

a. Appropriate Air Traffic frequencies shall be monitored during flight operations.

b. All UAS crew positions must maintain two-way communications with each other during all operations. If unable to maintain two-way communication, the UA will be expeditiously returned to its base of operations while remaining within the Primary Containment Area, and conclude the flight operation.

c. Spectrum used for operation and control of the UA must be approved by the Federal Communications Commission or other appropriate government oversight agency prior to operations being conducted.

## **6. FLIGHT CONDITIONS:**

a. All flight operations must be conducted during daylight hours in visual meteorological conditions (VMC), including cloud clearance minimums as specified in § 91.155. Flight operation in instrument meteorological conditions (IMC) is not permitted.

b. The UA is prohibited from aerobatic flight, that is, an intentional maneuver involving an abrupt change in the UA's attitude, an abnormal acceleration, or other flight action not necessary for normal flight (§ 91.303).

c. Flight operations must not involve carrying hazardous material or the dropping of any objects or external stores.



d. The UA and shall be equipped with operable strobe/anti-collision lights and shall be illuminated during operations.

e. Aurora Flight Sciences must request the issuance of a Notice to Airman (NOTAM) through the local Automated Flight Service Station at least twenty-four 24 hours prior to flight operation.

#### **7. FLIGHT TERMINATION & LOST LINK PROCEDURES:**

a. In accordance with Aurora Flight Sciences Program Letter, Aurora Report Number AR07-139 dated October 3, 2007, flight termination must be initiated at any point that safe operation of the UA cannot be maintained.

b. In the event of lost link, the UA must provide a means of automatic recovery that ensures airborne operations are predictable and that the UA remains within the flight test area. The observer will be immediately notified of the lost link condition and the expected UA response.

#### **8. MAINTENANCE:**

a. The GE-50 UAS must not be operated unless it is inspected and maintained in accordance with the GE-50 Preflight Inspection report AR07-069A, and the GE-50 Postflight Inspection report AR07-070A both dated July 26, 2007, or later FAA-accepted revision. Maintenance must be recorded in the UAS maintenance records.

b. No person may operate this UAS unless within the preceding 12 calendar months it has had a condition inspection performed in accordance with, FAA-accepted, GE-50 Preflight Inspection report AR07-069A, and the GE-50 Postflight Inspection report AR07-070A both dated July 26, 2007, and was found to be in a condition for safe operation. This inspection will be recorded in the UAS maintenance records.

c. Only those individuals authorized by Aurora Flight Sciences, and acceptable to the FAA, may perform inspections required by these operating limitations.

d. Inspections of the UAS must be recorded in the UAS maintenance records showing the following, or a similarly worded, statement: "I certify that this UAS has been inspected on [insert date] in accordance with the scope and detail of the GE-50 Preflight Inspection report AR07-069A, and the GE-50 Postflight Inspection report AR07-070A both dated July 26, 2007." The entry will include the UAS's total time-in-service, and the name and signature of the person performing the inspection and the date the inspection was performed.

e. UAS instruments and equipment installed must be inspected and maintained in accordance with the requirements of the GE-50 Preflight Inspection report AR07-069A, and the GE-50 Postflight Inspection report AR07-070A both dated July 26, 2007. Any maintenance or inspection of this equipment must be recorded in the UAS maintenance records.



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**9. EQUIPAGE:**

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The GE-50 Ground Control Station will be equipped with two-way communications equipment allowing for communications between the UA pilot and Air Traffic Control.

**10. INFORMATION REPORTING**

Aurora Flight Sciences shall provide the following information to Donald E Grampp@faa.gov, AIR-200 on a monthly basis.

- a. Number of flights conducted under this certificate.
- b. Pilot duty time per flight.
- c. Unusual equipment malfunctions (hardware or software), if any.
- d. Deviations from ATC instructions.
- e. Unintended entry into lost link flight mode that results in a course change.

**11. REVISIONS**

- a. The experimental certificate, Aurora Flight Sciences FAA-accepted program letter, and operating limitations cannot be reissued, renewed, or revised without first notifying the Production and Airworthiness Division, AIR-200 and application being made to the New Cumberland MIDO. AIR-200 will be responsible for headquarters internal coordination with the Aircraft Certification Service, Flight Standards Service, Air Traffic, Office of Chief Council, and Office of Rulemaking.
- b. No Certificate of Authorization or Waiver may be issued in association with this Experimental Certificate unless it is coordinated with AIR-200.
- c. The provisions and limitations annotated in this operational approval may be amended or cancelled at any time as deemed necessary by the FAA.
- d. All revisions to Aurora FAA-accepted GE-50 Preflight Inspection report AR07-069A, and the GE-50 Postflight Inspection report AR07-070A both dated July 26, 2007, or later FAA-accepted revision must be reviewed and accepted by the Washington Flight Standards District Office.

**12. UA MODIFICATIONS**

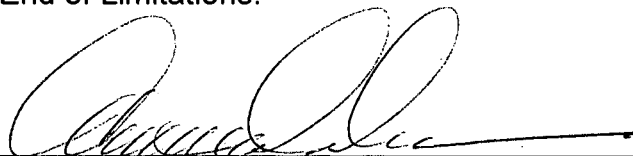
- a. All software and system changes will be documented as part of the normal maintenance procedures and be available for inspection. All software and system changes shall be inspected and approved per Aurora's maintenance procedures. All software changes to the aircraft and GCS are categorized as major changes, and shall be provided in summary form at the time they are incorporated.



b. All major modifications, whether performed under the experimental certificate, COA, or other authorizations, that could potentially effect the safe operation of the system, shall be documented and shall be provided to the FAA prior to operating the aircraft under this certificate. Major modifications incorporated under COA or other authorization need only be provided if the aircraft is flown under these authorizations during the effective period of the experimental certificate.

c. All information requested shall be provided to AIR-200.

End of Limitations.



Henry K. Cooper  
Senior Aviation Safety Inspector  
New Cumberland Manufacturing Inspection District Office  
Bldg. 201, Rm. 102,  
400 Airport Road  
New Cumberland, PA 17070-3419

DEC 07 2007

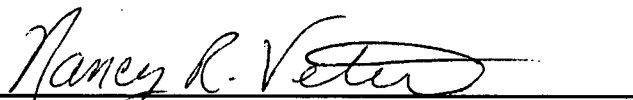
Issuance Date:

The Special Airworthiness Certificate and accompanying Operating Limitations expire on

DEC 06 2008

I certify that I have read and understand the operating limitations, and conditions, that are a part of the Special Airworthiness Certificate; FAA Form 8130-7 issued on for the purposes of Research and Development, Market Survey and/or Crew Training.

This Special Airworthiness Certificate is issued for the Aurora Flight Sciences Systems, UA model "GE-50," serial number AU-027, registration number N827AU.



Applicant:

Date: December 7, 2007

Name: Nancy R. Vetere

Title: UAV Flight Operations Manager

Company: Aurora Flight Sciences

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# FAA FORM 8130-6, APPLICATION FOR U.S. AIRWORTHINESS CERTIFICATE

Form Approved O.M.B. No. 2120-0018  
09/30/2007

 <b>U.S. Department of Transportation Federal Aviation Administration</b>		<b>APPLICATION FOR U.S. AIRWORTHINESS CERTIFICATE</b>		<b>INSTRUCTIONS</b> - Print or type. Do not write in shaded areas; these are for FAA use only. Submit original only to an authorized FAA Representative. If additional space is required, use attachment. For special flight permits complete Sections II, VI and VII as applicable.																																																																																																																																																																																																														
		<b>I. AIRCRAFT DESIGNATION</b>	1. REGISTRATION MARK <b>N827AU</b>	2. AIRCRAFT BUILDER'S NAME (Make) <b>Aurora Flight Sciences Corp</b>	3. AIRCRAFT MODEL DESIGNATION <b>Golden Eye 50</b>	4. YR. MFR. <b>2006</b>	FAA CODING <b>061001N</b>																																																																																																																																																																																																											
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<input checked="" type="checkbox"/> CHECK IF RECORDS IN COMPLIANCE WITH 14 CFR Section 91.417			TOTAL AIRFRAME HOURS <b>0.6 hours</b>			3 EXPERIMENTAL ONLY (Enter hours flown since last certificate issued or renewed) <b>0 hours</b>																																																																																																																																																																																																												
D. CERTIFICATION - I hereby certify that I am the registered owner (or his agent) of the aircraft described above, that the aircraft is registered with the Federal Aviation Administration in accordance with Title 49 of the United States Code 44101, et seq. and applicable Federal Aviation Regulations, and that the aircraft has been inspected and is airworthy and eligible for the airworthiness certificate requested.																																																																																																																																																																																																																		
DATE OF APPLICATION <b>12/7/2007</b>			NAME AND TITLE (Print or type) <b>Nancy R. Vetere, UAV Flight Operations Manager</b>			SIGNATURE 																																																																																																																																																																																																												
<b>IV. INSPECTION AGENCY VERIFICATION</b>																																																																																																																																																																																																																		
A. THE AIRCRAFT DESCRIBED ABOVE HAS BEEN INSPECTED AND FOUND AIRWORTHY BY: (Complete the section only if 14 CFR part 21.193(d) applies.																																																																																																																																																																																																																		
2		14 CFR part 121 CERTIFICATE HOLDER (Give Certificate No.)		3		CERTIFICATED MECHANIC (Give Certificate No.)		6		CERTIFICATED REPAIR STATION (Give Certificate No.)																																																																																																																																																																																																								
5		AIRCRAFT MANUFACTURER (Give name or firm)																																																																																																																																																																																																																
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(Check ALL applicable block items A and B)																																																																																																																																																																																																																		
A. I find that the aircraft described in Section I or VII meets requirements for																																																																																																																																																																																																																		
				<input checked="" type="checkbox"/> THE CERTIFICATE REQUESTED																																																																																																																																																																																																														
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B. Inspection for a special permit under Section VII was conducted by:																																																																																																																																																																																																																		
				FAA INSPECTOR				FAA DESIGNEE																																																																																																																																																																																																										
				CERTIFICATE HOLDER UNDER				14 CFR part 65																																																																																																																																																																																																										
DATE <b>12/7/2007</b>				DISTRICT OFFICE <b>ANE-MIDO-44</b>				DESIGNEE'S SIGNATURE AND NO.  <b>HENRY K. COOPER</b>																																																																																																																																																																																																										



<b>VI. PRODUCTION FLIGHT TESTING</b>	A. MANUFACTURER				
	NAME			ADDRESS	
	B. PRODUCTION BASIS <i>(Check applicable item)</i>				
	<input type="checkbox"/> PRODUCTION CERTIFICATE <i>(Give production certificate number)</i> _____ → <input type="checkbox"/> TYPE CERTIFICATE ONLY <input type="checkbox"/> APPROVED PRODUCTION INSPECTION SYSTEM				
	C. GIVE QUANTITY OF CERTIFICATES REQUIRED FOR OPERATING NEEDS				
	DATE OF APPLICATION		NAME AND TITLE <i>(Print or Type)</i>		SIGNATURE
<b>VII. SPECIAL FLIGHT PERMIT PURPOSES OTHER THAN PRODUCTION FLIGHT TEST</b>	A. DESCRIPTION OF AIRCRAFT			REGISTERED OWNER	
	BUILDER <i>(Make)</i>			MODEL	
	SERIAL NUMBER			REGISTRATION MARK	
	B. DESCRIPTION OF FLIGHT				
	FROM			TO	
	VIA			DEPARTURE DATE	
				DURATION	
	C. CREW REQUIRED TO OPERATE THE AIRCRAFT AND ITS EQUIPMENT				
	<input type="checkbox"/> PILOT		<input type="checkbox"/> CO-PILOT		<input type="checkbox"/> OTHER <i>(Specify)</i>
	D. THE AIRCRAFT DOES NOT MEET THE APPLICABLE AIRWORTHINESS REQUIREMENTS AS FOLLOWS:				
	E. THE FOLLOWING RESTRICTIONS ARE CONSIDERED NECESSARY FOR SAFE OPERATION: <i>(Use attachment if necessary)</i>				
	F. CERTIFICATION – I hereby certify that I am the registered owner (or his agent) of the aircraft described above; that the aircraft is registered with the Federal Aviation Administration in accordance with Title 49 of the United States Code 44101 <u>et seq.</u> and applicable Federal Aviation Regulations; and that the aircraft has been inspected and is safe for the flight described.				
DATE		NAME AND TITLE <i>(Print or Type)</i>		SIGNATURE	
<b>VIII. AIRWORTHINESS DOCUMENTATION (FAADESIGNEE use only)</b>	<input checked="" type="checkbox"/>	A. Operating Limitations and Markings in Compliance with 14 CFR Section 91.9, as applicable.			G. Statement of Conformity, FAA Form 8130-9 <i>(Attach when required)</i>
	<input checked="" type="checkbox"/>	B. Current Operating Limitations Attached			H. Foreign Airworthiness Certification for Import Aircraft <i>(Attach when required)</i>
	<input checked="" type="checkbox"/>	C. Data, Drawings, Photographs, etc. <i>(Attach when required)</i>			I. Previous Airworthiness Certificate Issued in Accordance with 14 CFR Section _____ CAR _____ <i>(Original Attached)</i>
	<input checked="" type="checkbox"/>	D. Current Weight and Balance information Available in Aircraft			<input checked="" type="checkbox"/> J. Current Airworthiness Certificate Issued in Accordance with 14 CFR Section <u>21.191 (a)(c) (4)</u> <i>(Copy Attached)</i>
		E. Major Repair and Alteration, FAA Form 337 <i>(Attach when required)</i>			K. Light-Sport Aircraft Statement of Compliance, FAA Form 8130-15 <i>(Attach when required)</i>
	<input checked="" type="checkbox"/>	F. This inspection Recorded in Aircraft Records			



UNITED STATES OF AMERICA  
DEPARTMENT OF TRANSPORTATION - FEDERAL AVIATION ADMINISTRATION

## SPECIAL AIRWORTHINESS CERTIFICATE

<b>A</b>	CATEGORY/DESIGNATION <b>EXPERIMENTAL (UNMANNED AIRCRAFT)</b>	
	PURPOSE <b>Research &amp; Development/Market Svy./Crew Training</b>	
<b>B</b>	MANUFACTURER	NAME <b>N/A</b>
		ADDRESS <b>N/A</b>
<b>C</b>	FLIGHT	FROM <b>N/A</b>
		TO <b>N/A</b>
<b>D</b>	<b>N-827AU</b>	SERIAL NO. <b>AU-027</b>
	<b>BUILDER Aurora Flight Sciences</b>	MODEL <b>GE-50</b>
<b>E</b>	DATE OF ISSUANCE <b>December 7, 2007</b>	EXPIRY <b>December 6, 2008</b>
	OPERATING LIMITATIONS DATED <b>12/07/07</b>	ARE PART OF THIS CERTIFICATE
	SIGNATURE OF FAA REPRESENTATIVE <i>Henry K. Cooper</i>	DESIGNATION OR OFFICE NO.
	<b>Henry K. Cooper</b>	<b>ANE-MIDO-44</b>

**COPY**

Any alteration, reproduction or misuse of this certificate may be punishable by a fine not exceeding \$1,000 or imprisonment not exceeding 3 years, or both. THIS CERTIFICATE MUST BE DISPLAYED IN THE AIRCRAFT IN ACCORDANCE WITH APPLICABLE TITLE 14, CODE OF FEDERAL REGULATIONS (CFR).

<b>A</b>	This airworthiness certificate is issued under the authority of Public Law 104-6, 49 United States Code (USC) 44704 and Title 14 Code of Federal Regulations (CFR).
<b>B</b>	The airworthiness certificate authorizes the manufacturer named on the reverse side to conduct production flight tests, and only production flight tests, of aircraft registered in his name. No person may conduct production flight tests under this certificate: (1) Carrying persons or property for compensation or hire; and/or (2) Carrying persons not essential to the purpose of the flight.
<b>C</b>	This airworthiness certificate authorizes the flight specified on the reverse side for the purpose shown in Block A.
<b>D</b>	This airworthiness certificate certifies that as of the date of issuance, the aircraft to which issued has been inspected and found to meet the requirements of the applicable CFR. The aircraft does not meet the requirements of the applicable comprehensive and detailed airworthiness code as provided by Annex 8 to the Convention On International Civil Aviation. No person may operate the aircraft described on the reverse side: (1) except in accordance with the applicable CFR and in accordance with conditions and limitations which may be prescribed by the Administrator as part of this certificate; (2) over any foreign country without the special permission of that country.
<b>E</b>	Unless sooner surrendered, suspended, or revoked, this airworthiness certificate is effective for the duration and under the conditions prescribed in 14 CFR, Part 21, Section 21.181 or 21.217.



U.S. Department  
of Transportation  
**Federal Aviation  
Administration**

New Cumberland Manufacturing Inspection District Office  
Bldg. 201, Rm. 102,  
400 Airport Drive  
New Cumberland, PA 17070

**EXPERIMENTAL - OPERATING LIMITATIONS**  
**RESEARCH AND DEVELOPMENT, CREW TRAINING, and MARKET SURVEY.**

<b>REGISTERED OWNER NAME:</b> AURORA FLIGHT SCIENCES CORPORATION	<b>AIRCRAFT BUILDER:</b> AURORA FLIGHT SCIENCES CORPORATION
<b>REGISTERED OWNER ADDRESS:</b> 9950 WAKEMAN DRIVE MANASSAS, VA 20110	<b>YEAR MANUFACTURED:</b> 2006
<b>AIRCRAFT DESCRIPTION:</b> DUCTED FAN VTOL	<b>AIRCRAFT SERIAL NUMBER:</b> AU-027
<b>AIRCRAFT REGISTRATION:</b> N827AU	<b>AIRCRAFT MODEL DESIGNATION:</b> GOLDEN EYE 50
	<b>ENGINE MODEL:</b> DESERT AIRCRAFT DA-50-R
	<b>PROPELLER MODEL:</b> CUSTOM 7-BLADE LIFT FAN

**The following conditions and limitations apply to all Aurora Flight Sciences Golden Eye 50, Unmanned Aircraft System flight operations, while operating in the National Airspace System (NAS). These conditions and limitations must be accessible to the pilot in command at all times.**

**1. GENERAL:**

a. For the purposes of this Special Airworthiness Certificate and Operating Limitations, the Golden Eye 50 (GE-50) Unmanned Aircraft System (UAS), owned and operated by Aurora Flight Sciences, is considered to be an integrated system. The system is composed of the GE-50 aircraft, S/N AU-027, UA control station(s) (fixed or mobile), telemetry, navigation and communications equipment to include ground and airborne equipment that is used for control of the GE-50 UA. The ground equipment used for communication with Air Traffic Control during UAS operations is considered part of the UAS.

**COPY**





b. Unless otherwise specified in this document, the UA Pilot-in-Command (PIC) and Aurora shall comply with all applicable sections and parts of 14 CFR including, but not limited to, parts 61 and 91.

c. No person may operate this UA for other than the purpose of Research and Development, Market Survey and/or Crew Training, to accomplish the flight operations outlined in Aurora Flight Sciences Program Letter, Aurora Report Number AR07-139 dated October 3, 2007 which describes compliance with § 21.193(d), and has been made available to the pilot in command of the UA. In addition, this UA must be operated in accordance with applicable air traffic and general operating rules of part 91, and all additional limitations herein prescribed under the provisions of § 91.319(e).

d. The UA PIC must determine that the UA is in a condition for safe operation and in a configuration appropriate for the purpose of the intended flight.

e. No person may operate this UA to carry property for compensation or hire.

f. This UA must be marked with its U.S. Registration number in accordance with 14 CFR part 45 or exemption thereto.

g. This UA must display the word "EXPERIMENTAL" in accordance with § 45.23(b) or exemption thereto.

h. Prior to conducting initial GE-50 flight operations, Aurora must forward an electronic copy of the GE-50 Program Letter, Special Airworthiness Certificate, and Operating Limitations to: Lynda Otting, FAA Air Traffic Representative, Eastern Service Center, System Support, 1701 Columbia Ave, College Park, GA 30337, telephone (404) 305-5577, email Lynda.G.Otting@faa.gov.

i. Section 47.45 requires that the FAA Aircraft Registry must be notified within 30 days of any change in the aircraft registrant's address. Such notification is to be made by submitting AC Form 8050-1 to AFS-750 in Oklahoma City, Oklahoma.

**2. PROGRAM LETTER:** The Aurora Flight Sciences Program Letter, Aurora Report Number AR07-139 dated October 3, 2007 shall be used as a basis for the determination of the operating limitations prescribed in this document. All flight operations must be conducted in accordance with the provisions of these operating limitations.

### **3. AUTHORIZED FLIGHT OPERATIONS AREA:**

a. The base of operations for the UA shall be:

Flying Circus Aerodrome (3VA3)  
5414 Ritchie Rd  
Bealeton, VA 22712

COPY

b. The flight test operations area authorized for the UA at Flying Circus Aerodrome (3VA3) are graphically depicted below.



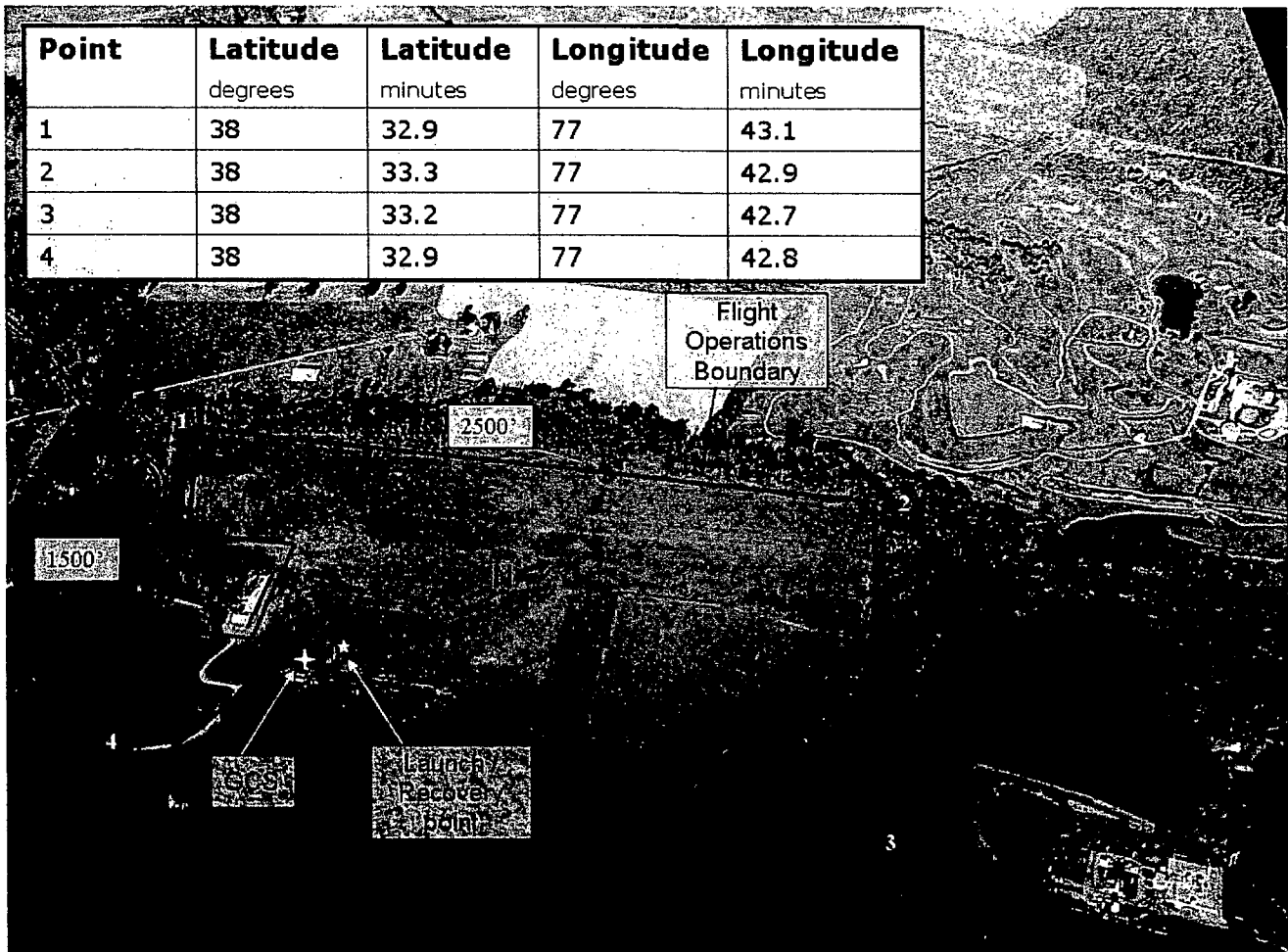


Figure 1. Proposed operations area at Flying Circus Aerodrome

c. Aurora shall notify the airport manager/owner, prior each operation, for coordination with any other potential activity in the vicinity.

d. The UA PIC shall ensure that all UA flight operations remain within the lateral and vertical boundaries of the flight test operations area at The Flying Circus Aerodrome (3AV3). Furthermore, the UA PIC shall take into account all factors that may affect the capability of remaining within the flight test operations area at The Flying Circus Aerodrome (3AV3). This includes, but is not limited to, considerations for wind, gross weight, and glide distances.

e. Any flight operation that transgresses the lateral or vertical boundaries of the flight test operations area at shall be immediately concluded, and Air Traffic Control notified of the flight status. Aurora shall, at the conclusion of the flight, immediately notify the Manager of the Unmanned Aircraft Program Office AIR-160, of any flight operation that transgresses the lateral or vertical boundaries of the flight test operations area at The Flying Circus Aerodrome (3AV3). The point of contact is Mr. Doug Davis. Mr. Davis can be reached at 202-385-4636 or email [kenneth.d.davis@faa.gov](mailto:kenneth.d.davis@faa.gov).

COPY



f. Further flight operations shall not be conducted until the incident is reviewed by AIR-160, and authorization to resume operations is received.

g. Aircraft operations for the purpose of market survey cannot be performed until after 50 flight hours have been accomplished. A logbook entry is required as evidence of compliance.

#### **4. UA PILOTS and OBSERVERS:**

a. All flight operations shall have a designated UA Pilot-In-Command (PIC). Any additional UA pilot(s) assigned to a crew station during UA flight operations shall be considered a Supplemental UA Pilot. The UA PIC shall have responsibility over each flight conducted and be held accountable for the UA flight operation.

b. The UA PIC is responsible for the safety of the UA as well as persons and property along the UA flight path. This includes, but is not limited to, collision avoidance and the safety of persons and property in the air and on the ground. The UA PIC shall avoid densely populated areas (§ 91.319) and exercise increased vigilance when operating within or in the vicinity of published airway boundaries.

c. The UA PIC shall hold, at a minimum, an FAA Private Pilot certificate, with either an Airplane or Rotorcraft category, Single or Multiengine class ratings, or military equivalent, and have it in his/her possession.

d. The Supplemental Pilot need not be a certificated pilot, but must have successfully completed a recognized Private Pilot ground school and successfully completed the private pilot written test.

e. The UA PIC shall have operational override capability over any Supplemental Pilot, regardless of position.

f. The UA PIC shall maintain currency in manned aircraft in accordance with § 61.57.

g. The UA PIC shall have a Flight Review in manned aircraft every 24 calendar months in accordance with § 61.56.

h. All UA Pilots shall maintain currency in unmanned aircraft in accordance with Aurora GoldenEye-50 Operator Training AR07-102.

i. All UA pilots shall have a Flight Review in unmanned aircraft every 24 calendar months in accordance with Aurora company procedures.

j. All flight operations conducted shall have an Observer to perform traffic avoidance and visual observation to fulfill the "see and avoid" requirement of § 91.113.

COPY



k. All Observers shall:

1) Hold at a minimum, an FAA Private Pilot certificate or military equivalent (an Observer does not require currency as a pilot); or,

2) In lieu of a Pilot certificate, have successfully completed specific Observer training acceptable to the FAA.

l. The UA PIC and Observer(s) must have in their possession a valid third class (or higher) airman medical certificate that has been issued under 14 CFR part 67.

m. UA Pilots and Observers shall perform crew duties for only one UA at a time.

n. All Observers must be thoroughly trained, familiar with, and possess, operational experience with the equipment being utilized for observation and detection of other aircraft for collision avoidance purposes as outlined in the Aurora Program Letter.

o. Observer Responsibilities: The task of the Observer is to provide the UA pilot(s) with instructions to maneuver the UA clear of any potential collision with other traffic. Observer duties require continuous visual contact with the UA at all times in such a manner as to be able to discern UA attitude and trajectory in relation to conflicting traffic. At no time shall Observers conduct their duties more than 1300 feet laterally or 400 feet vertically from the UA.

## **5. COMMUNICATIONS:**

a. Appropriate Air Traffic frequencies shall be monitored during flight operations.

b. All UAS crew positions must maintain two-way communications with each other during all operations. If unable to maintain two-way communication, the UA will be expeditiously returned to its base of operations while remaining within the Primary Containment Area, and conclude the flight operation.

c. Spectrum used for operation and control of the UA must be approved by the Federal Communications Commission or other appropriate government oversight agency prior to operations being conducted.

## **6. FLIGHT CONDITIONS:**

a. All flight operations must be conducted during daylight hours in visual meteorological conditions (VMC), including cloud clearance minimums as specified in § 91.155. Flight operation in instrument meteorological conditions (IMC) is not permitted.

b. The UA is prohibited from aerobatic flight, that is, an intentional maneuver involving an abrupt change in the UA's attitude, an abnormal acceleration, or other flight action not necessary for normal flight (§ 91.303).

c. Flight operations must not involve carrying hazardous material or the dropping of any objects or external stores.





d. The UA and shall be equipped with operable strobe/anti-collision lights and shall be illuminated during operations.

e. Aurora Flight Sciences must request the issuance of a Notice to Airman (NOTAM) through the local Automated Flight Service Station at least twenty-four 24 hours prior to flight operation.

## **7. FLIGHT TERMINATION & LOST LINK PROCEDURES:**

a. In accordance with Aurora Flight Sciences Program Letter, Aurora Report Number AR07-139 dated October 3, 2007, flight termination must be initiated at any point that safe operation of the UA cannot be maintained.

b. In the event of lost link, the UA must provide a means of automatic recovery that ensures airborne operations are predictable and that the UA remains within the flight test area. The observer will be immediately notified of the lost link condition and the expected UA response.

## **8. MAINTENANCE:**

a. The GE-50 UAS must not be operated unless it is inspected and maintained in accordance with the GE-50 Preflight Inspection report AR07-069A, and the GE-50 Postflight Inspection report AR07-070A both dated July 26, 2007, or later FAA-accepted revision. Maintenance must be recorded in the UAS maintenance records.

b. No person may operate this UAS unless within the preceding 12 calendar months it has had a condition inspection performed in accordance with, FAA-accepted, GE-50 Preflight Inspection report AR07-069A, and the GE-50 Postflight Inspection report AR07-070A both dated July 26, 2007, and was found to be in a condition for safe operation. This inspection will be recorded in the UAS maintenance records.

c. Only those individuals authorized by Aurora Flight Sciences, and acceptable to the FAA, may perform inspections required by these operating limitations.

d. Inspections of the UAS must be recorded in the UAS maintenance records showing the following, or a similarly worded, statement: "I certify that this UAS has been inspected on [insert date] in accordance with the scope and detail of the GE-50 Preflight Inspection report AR07-069A, and the GE-50 Postflight Inspection report AR07-070A both dated July 26, 2007." The entry will include the UAS's total time-in-service, and the name and signature of the person performing the inspection and the date the inspection was performed.

e. UAS instruments and equipment installed must be inspected and maintained in accordance with the requirements of the GE-50 Preflight Inspection report AR07-069A, and the GE-50 Postflight Inspection report AR07-070A both dated July 26, 2007. Any maintenance or inspection of this equipment must be recorded in the UAS maintenance records.

COPY



## **9. EQUIPAGE:**

The GE-50 Ground Control Station will be equipped with two-way communications equipment allowing for communications between the UA pilot and Air Traffic Control.

## **10. INFORMATION REPORTING**

Aurora Flight Sciences shall provide the following information to Donald E Grampp@faa.gov , AIR-200 on a monthly basis.

- a. Number of flights conducted under this certificate.
- b. Pilot duty time per flight.
- c. Unusual equipment malfunctions (hardware or software), if any.
- d. Deviations from ATC instructions.
- e. Unintended entry into lost link flight mode that results in a course change.

## **11. REVISIONS**

a. The experimental certificate, Aurora Flight Sciences FAA-accepted program letter, and operating limitations cannot be reissued, renewed, or revised without first notifying the Production and Airworthiness Division, AIR-200 and application being made to the New Cumberland MIDO. AIR-200 will be responsible for headquarters internal coordination with the Aircraft Certification Service, Flight Standards Service, Air Traffic, Office of Chief Council, and Office of Rulemaking.

b. No Certificate of Authorization or Waiver may be issued in association with this Experimental Certificate unless it is coordinated with AIR-200.

c. The provisions and limitations annotated in this operational approval may be amended or cancelled at any time as deemed necessary by the FAA.

d. All revisions to Aurora FAA-accepted GE-50 Preflight Inspection report AR07-069A, and the GE-50 Postflight Inspection report AR07-070A both dated July 26, 2007, or later FAA-accepted revision must be reviewed and accepted by the Washington Flight Standards District Office.

## **12. UA MODIFICATIONS**

a. All software and system changes will be documented as part of the normal maintenance procedures and be available for inspection. All software and system changes shall be inspected and approved per Aurora's maintenance procedures. All software changes to the aircraft and GCS are categorized as major changes, and shall be provided in summary form at the time they are incorporated.

COPY



b. All major modifications, whether performed under the experimental certificate, COA, or other authorizations, that could potentially effect the safe operation of the system, shall be documented and shall be provided to the FAA prior to operating the aircraft under this certificate. Major modifications incorporated under COA or other authorization need only be provided if the aircraft is flown under these authorizations during the effective period of the experimental certificate.

c. All information requested shall be provided to AIR-200.

End of Limitations.



Henry K. Cooper  
Senior Aviation Safety Inspector  
New Cumberland Manufacturing Inspection District Office  
Bldg. 201, Rm. 102,  
400 Airport Road  
New Cumberland, PA 17070-3419

DEC 07 2007

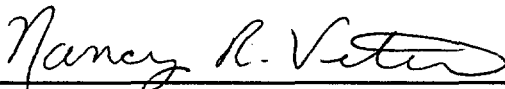
Issuance Date:

The Special Airworthiness Certificate and accompanying Operating Limitations expire on

DEC 06 2008

I certify that I have read and understand the operating limitations, and conditions, that are a part of the Special Airworthiness Certificate; FAA Form 8130-7 issued on for the purposes of Research and Development, Market Survey and/or Crew Training.

This Special Airworthiness Certificate is issued for the Aurora Flight Sciences Systems, UA model "GE-50," serial number AU-027, registration number N827AU.



Applicant:

Date: December 7, 2007

Name: Nancy R. Vetere

Title: UAV Flight Operations Manager

Company: Aurora Flight Sciences

COPY





U.S. Department  
of Transportation  
**Federal Aviation  
Administration**

800 Independence Ave., S.W.  
Washington, D.C. 20591

**MAY 16 2007**

Exemption No. 9290  
Regulatory Docket No. FAA-2007-28070

Ms. Nancy R. Vetere  
UAV Flight Operations Manager  
Aurora Flight Sciences Corporation  
9950 Wakeman Drive  
Manassas, VA 20110

Dear Ms. Vetere:

This letter is to inform you that we have granted your request for exemption. It transmits our decision, explains its basis, and gives you the conditions and limitations of the exemption, including the date it ends.

#### **The Basis for Our Decision**

On April 25, 2007, you petitioned the Federal Aviation Administration (FAA) on behalf of Aurora Flight Sciences Corporation (Aurora) for an exemption from §§ 91.9(b) and 91.203(a) and (b) of Title 14, Code of Federal Regulations (14 CFR). That exemption, if granted, would allow Aurora to operate unmanned aerial vehicles (UAVs) that do not carry and display the aircraft's airworthiness, certification, and registration documents required in part 91.

The FAA has determined that good cause exists for not publishing a summary of the petition in the Federal Register because the requested exemption would not set a precedent, and any delay in acting on this petition would be detrimental to Aurora.

The FAA has issued a grant of exemption in circumstances similar in all material respects to those presented in your petition. In Grant of Exemption No. 8607 (copy enclosed), the FAA found that it is unnecessary to carry and display the airworthiness, certification, and registration documents in unmanned aircraft systems for the operations described by the

E-2007-0595





petitioner. The original intent of the subject regulation was to display the airworthiness and registration documents so they would be easily available to FAA inspectors and passengers.

Having reviewed your reasons for requesting an exemption, I find that—

- they don't differ materially from those presented by the petitioner in the enclosed grant of exemption;
- the reasons stated by the FAA for granting the enclosed exemption also apply to the situation you present; and
- a grant of exemption is in the public interest.

### **Our Decision**


Under the authority contained in 49 U.S.C. 40113 and 44701, which the FAA Administrator has delegated to me, I hereby grant Aurora Flight Sciences Corporation an exemption from 14 CFR §§ 91.9(b) and 91.203(a) and (b) to the extent necessary to operate UAVs without carrying the airworthiness and registration documents required by part 91, subject to the conditions and limitations described below.

### **Conditions and Limitations**

1. The documents required under §§ 91.9 and 91.203 must be available to the pilot in command of the UAVs any time the aircraft is operating.
2. Those documents required under § 91.9 or 91.203 must be made available within 10 days to any FAA, U.S. Department of Defense, or law enforcement official upon request.

This exemption terminates on May 31, 2009, unless sooner superseded or rescinded.

Sincerely,

  
John M. Allen  
Acting Director, Flight Standards  
Service

Enclosure





U.S. Department  
of Transportation  
**Federal Aviation  
Administration**

May 11, 2007

Ms. Nancy R. Vetere  
UAV Flight Operations Manager  
Aurora Flight Sciences Corporation  
9950 Wakeman Drive  
Manassas, Virginia 20110

Dear Ms. Vetere:

Thank you for your letter dated May 9, 2007, requesting approval for a different marking procedure for Aurora's unmanned aircraft system. Title 14 Code of Federal Regulations § 45.22(d) permits persons to apply to the Administrator for a different marking procedure if it is impossible to mark an aircraft in accordance with §§ 45.21 and 45.23 through 45.33.

The marking information depicted in the presentation you provided with your letter has been reviewed. You are hereby authorized to identify the GE-50 and GE-80 aircraft with the following markings:

- For the GE-50: Nationality and Registration markings that are 2 inches tall and displayed horizontally when the aircraft is resting on its landing gear; the word "EXPERIMENTAL" in letters 2 inches tall.
- For the GE-80: Nationality and Registration markings that are 5 inches tall and displayed horizontally when the aircraft is resting on its landing gear; the word "EXPERIMENTAL" in letters 2 inches tall.

This marking procedure applies to all GE-50 and GE-80 aircraft of the same configuration for which future certification may be requested.

The following must be kept with the airworthiness certificate for each GE-50 and GE-80 aircraft:

- A copy of your original request letter dated May 9, 2007.
- A copy of the model-specific picture that was submitted with that letter, showing the size and location of the Nationality and Registration markings, and
- A copy of this response letter.

If there are any questions, please contact Mr. David Higginbotham at telephone 202-267-7525.

Sincerely,

Frank P. Paskiewicz  
Manager, Production and Airworthiness  
Division, AIR-200





May 9, 2007

Frank Paskiewicz, AIR-200  
Federal Aviation Administration  
800 Independence Ave, SW  
Washington, DC 20591

Dear Mr. Paskiewicz,

In accordance with 14 CFR 45.22(d), we hereby request your approval of marking of our GE-50 and GE-80 UAV as shown in the attached figures.

The configuration of the vehicle makes it impossible to mark the vehicle in strict accordance with the regulatory requirements.

Sincerely,

A handwritten signature in cursive script that reads "Nancy R. Vetere".

Nancy R. Vetere  
UAV Flight Operations Manager  
Aurora Flight Sciences

Attachment: GE-50 and GE-80 UAV Markings

**Aurora Flight Sciences Corporation**

9950 Wakeham Drive  
Manassas, VA 20110-2702  
703-369-3633 • Fax 703-369-4514

3000 East Benedum Industrial Drive  
Bridgeport, WV 26330-9683  
304-842-8100 • Fax 304-842-8118

One Broadway, 14th Floor  
Cambridge, MA 02142-1100  
617-225-4377 • Fax 617-225-4400

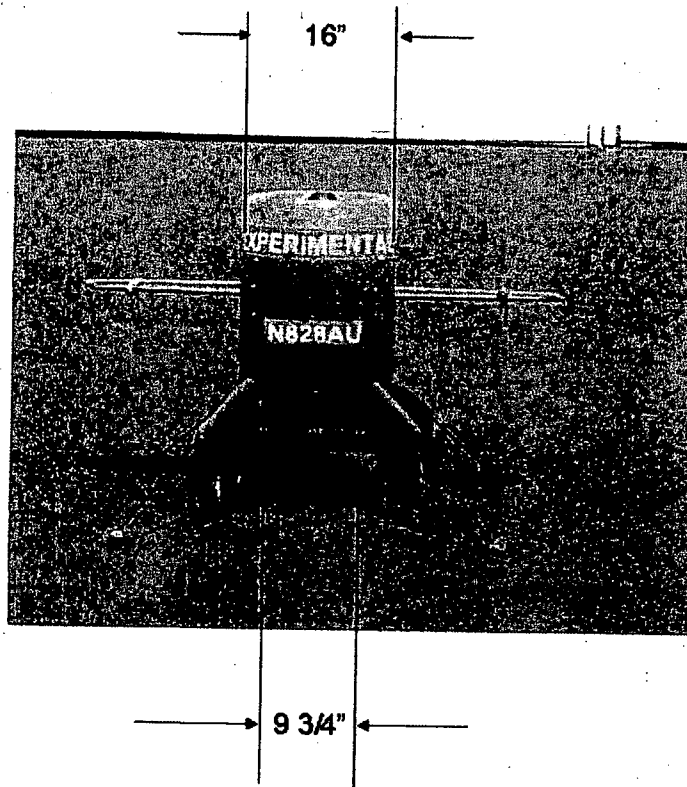
[www.aurora.aero](http://www.aurora.aero)  
2512 Arcen Road  
Columbus, MS 39501  
601-322-6227 • Fax 601-322-6271



# GE-50 Markings with Dimensions

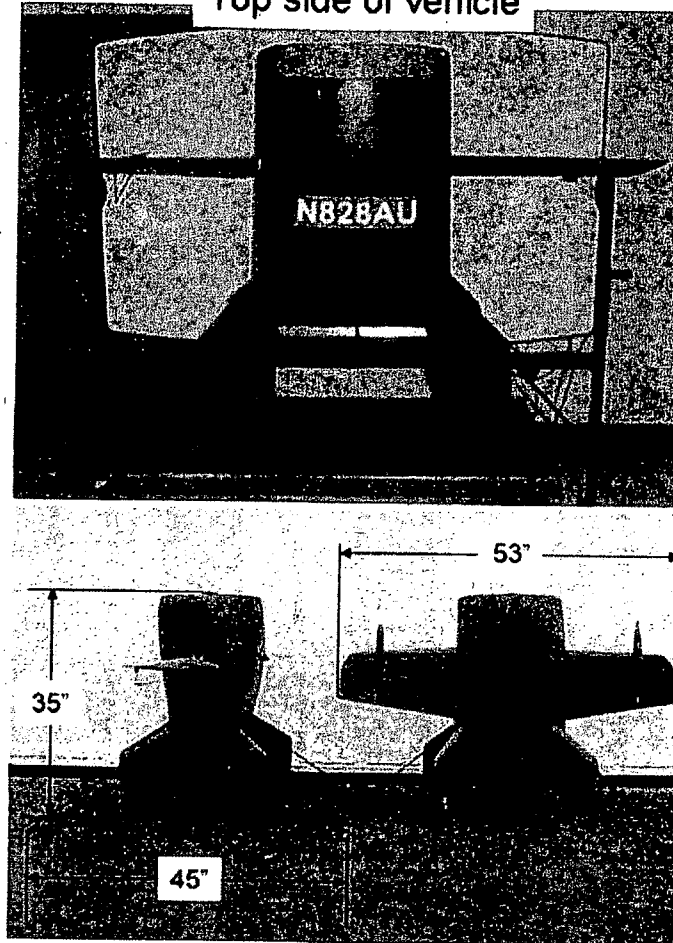


All letters are 2" tall.  
Top side dimensions are same as  
the lower for the registration #.



Bottom side of vehicle

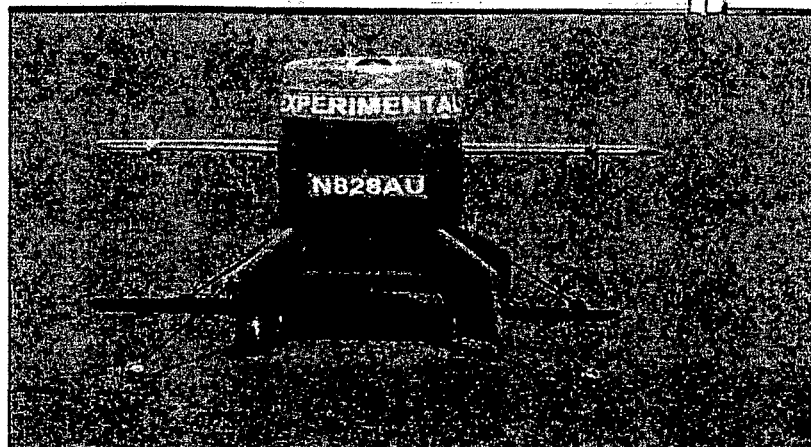
Top side of vehicle



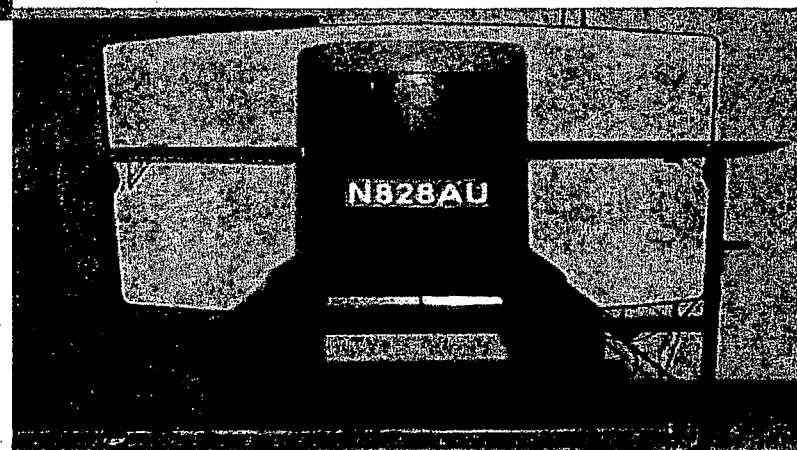




# GoldenEye 50



Markings will not have green background, but will be white against the fuselage background color. Markings will be 2 inches tall due to the small size of the vehicle and will be applied vinyl. Some vehicles will have different paint schemes including a lip which is not orange.











## PROGRAM LETTER FOR UNMANNED AIRCRAFT SYSTEMS

REGISTERED OWNER NAME:	AURORA FLIGHT SCIENCES CORPORATION
AIRCRAFT BUILDER:	AURORA FLIGHT SCIENCES CORPORATION
REGISTERED OWNER ADDRESS:	9950 WAKEMAN DRIVE MANASSAS, VA 20110
YEAR MANUFACTURED:	2006
AIRCRAFT DESCRIPTION:	DUCTED FAN VTOL UNMANNED AERIAL VEHICLE
AIRCRAFT SERIAL NUMBER:	AU-027
AIRCRAFT REGISTRATION:	N827AU
AIRCRAFT MODEL DESIGNATION:	GOLDENEYE 50 (GE-50)
ENGINE MODEL:	DESERT AIRCRAFT DA-50-R SINGLE-CYLINDER 2-CYCLE ENGINE
PROPELLER MODEL:	CUSTOM 7-BLADE LIFT FAN



**1. DEFINE THE EXPERIMENTAL PURPOSE(S) UNDER WHICH THE AIRCRAFT IS TO BE OPERATED (14 CFR § 21.191).**

In accordance with the above referenced regulation, Aurora Flight Sciences will operate the GoldenEye unmanned aerial vehicles for the purpose of research and development, crew training, and market surveys.

**2. DESCRIBE THE PURPOSE/SCOPE OF THE EXPERIMENTAL PROGRAM FOR EACH 14 CFR § 21.191 EXPERIMENTAL PURPOSE SOUGHT (14 CFR §§ 21.193(b)(d)).**

(1) Research and development – Aurora will fly the experimental GoldenEye vehicle to flight test the vehicle and to expand the flight envelope.

(2) Crew Training – Aurora will fly the vehicles as part of the company's training program to qualify crewmembers to operate the vehicles and to increase flying proficiency.

(3) Market Surveys – Aurora will fly the vehicle for sales demonstrations for potential customers.

**3. DEFINE THE AREA(S) IN WHICH THE EXPERIMENTAL FLIGHTS WILL BE CONDUCTED.**

**a. Describe the areas over which the flights are to be conducted and address of base operation (14 CFR § 21.193(d)(3)).**

Flights will be conducted at Flying Circus Aerodrome, Bealeton, VA

**b. Identify all proposed flight areas using latitude and longitude on aeronautical maps.**

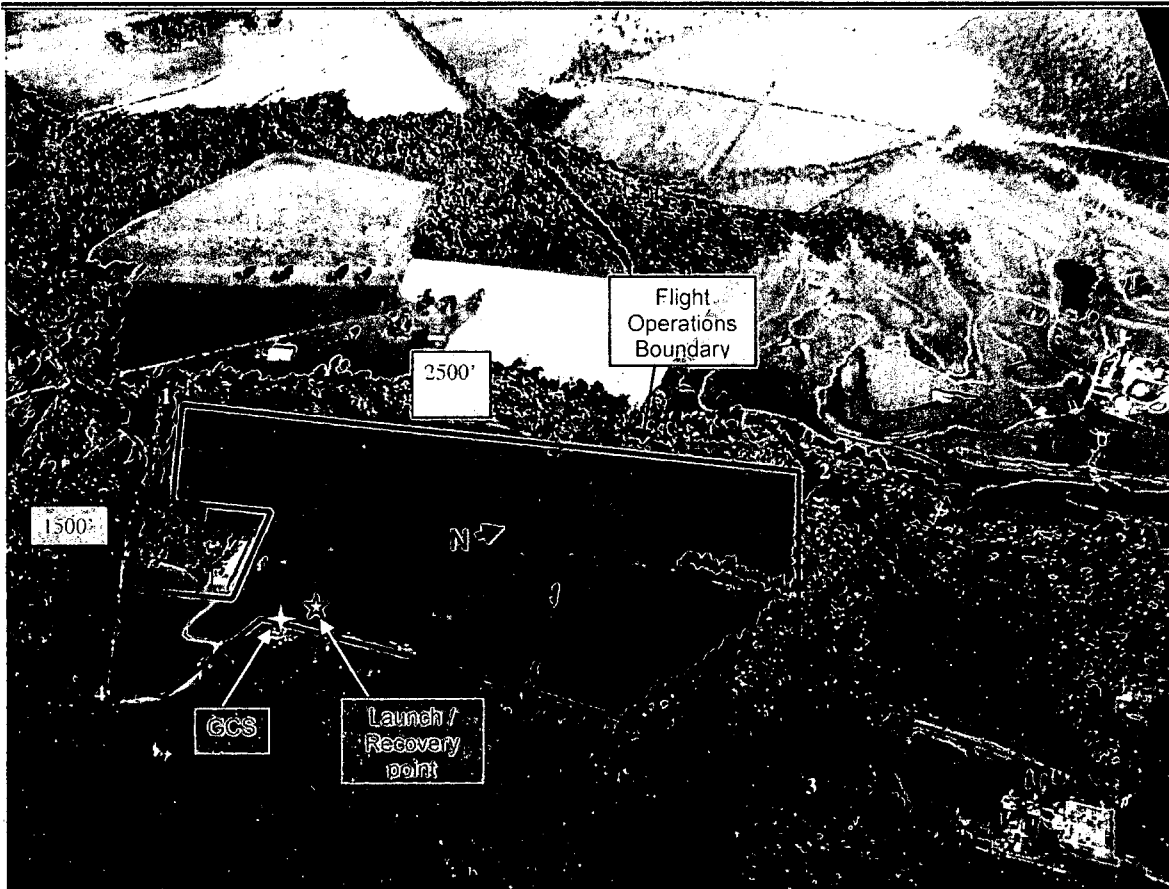
Flying Circus Aerodrome Bealeton, VA – Identifier 3VA3

POINT	LATITUDE degrees	LATITUDE minutes	LONGITUDE degrees	LONGITUDE minutes
1	38	32.9	77	43.1
2	38	33.3	77	42.9
3	38	33.2	77	42.7
4	38	32.9	77	42.8

**Note: The coordinates listed in the above table correspond to Waypoints 1 through 4 in Figure 1 below.**







**FIGURE (1) Flying Circus Aerodrome, Bealeton, Va**

- a. Include information on airspeed, altitude, number of flight hours, number of flights and program duration for each test flight area.**

	Airport/ Area	Airspeed Max	Altitude Max	Flight Hours (estimated)	# of Flights (estimated)	Program Duration
	3VA3 (Bealeton)	60 kts	400 AGL	125	250	1 year

- b. What class of airspace will be used?**

Aurora expects flying to occur in Class G airspace.



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**c. Will minimum fuel requirements of 14 CFR § 91.151 be met?**

Fuel burn is a precisely monitored flight test parameter. Current operations typically take place in a very small geographic area under visual conditions where immediate landing is possible, eliminating the need to fly an additional 30 or 45 minutes to find a suitable landing site.

**d. Will flight-testing include payload testing?**

Yes. The current vehicle payload is an E/O camera. Flight testing may include the testing of other payloads, except weaponized payloads are not expected to be tested.

**e. What considerations need to be taken with regard to payloads?**

None.

**f. Will the aircraft perform any aerobatic maneuvers?**

The vehicle does not perform aerobatic maneuvers. In addition to forward flight on the wing, flight maneuvers for the GoldenEye 50 vehicle include vertical takeoff and landing, hover flight, horizontal flight in the hover mode, turns about the vertical axis, and climbs and descents.

**g. Flight Conditions (e.g., VFR, IFR, VMS, etc.)**

VFR

**4. AIRCRAFT CONFIGURATION. Attach three-view drawings or three-view dimensioned photographs of the aircraft (14 CFR § 21.193(b)(4)). Describe Unmanned Aircraft System configuration including ground control station. Include a description of aircraft/system performance characteristics including:**

See Figures (1 and 2) at the end of this document.

Aircraft system configuration is a ducted fan with torsionally disconnected "free wings". The engine for the GE-50 engine and propeller is enclosed in the fuselage.

The Ground control station consists of a laptop computer with proprietary software. It is connected to a datalink antenna. The ground control station (GCS) communicates with the air vehicle by means of a 900 MHz datalink. Payload imagery is sent from the aircraft to the GCS over a separate 2.4 GHz datalink. Flight commands and vehicle flight reports are up- and downlinked via the datalink. Vehicle state and health information is reported on the GCS laptop display to the air vehicle operator.



GoldenEye-50	
a. Wing span	4.4 feet
b. Length	2.9 feet
c. Powerplant	Desert Aircraft DA-50 single-cylinder 2-cycle engine
d. Max gross take off weight	21 lbs
e. Fuel capacity	30 fluid oz
f. Payload capacity	2 lbs
g. Max altitude	5000 feet
h. Endurance	20 minutes
i. Max airspeed	40 kts
j. Control/data frequencies	900MHz frequency-hopping spread- spectrum (command & control) 2.4GHz (payload data)
k. Guidance and navigation control	GuideStar computer (Athena Technologies Inc)

## 5. INSPECTION AND MAINTENANCE (14 CFR Part 91 Subpart E).

- a. Describe the inspection and maintenance program that will be used to maintain the aircraft and related systems (includes ground stations and/or other support systems).**

Due to the current phase of the GE-50 program, inspection and maintenance program is currently a continuous maintenance program rather than one based on periodic inspections. Aurora maintenance procedures include thorough pre-flight and post-flight checklists which cover all systems. Maintenance is also performed on the vehicle between flights. These checklists have been previously approved during the certification of the first GE-50, N828AU.

- b. Provide copy of flight manual, if applicable, current weight and balance report, equipment list.**

The GE-50 Standard Operating Procedures have been previously provided to the FAA. Weight and balance information for this specific vehicle, N827AU, will be provided for review.

## 6. PILOT QUALIFICATION (14 CFR §§ 61.3, 61.5).

- 1. Describe the qualifications for each pilot.**

Flights are supervised by at least one FAA certificated pilot. Aurora UAV operators have previous UAV experience through either commercial and/or military operations and many have been involved in the system design and





development. All crewmembers undergo an Aurora qualification program. Additional crewmembers may be trained throughout the year.

Aurora Crewmember	Qualifications
Flight Director (PIC)	Airline Transport Pilot License Aurora trained GE50 flight director (PIC)
Operator (Supplemental Pilot)	Prior Military UAV Instructor Pilot Aurora trained operator
Operator (Supplemental Pilot)	GE50 Technician Aurora trained operator
Crew Chief	Aurora trained crew chief
Trainee	Prior Military UAV Standardization Instructor Pilot Aurora operator in training
Trainee	Private Pilot License, Aurora operator and flight director in training
Trainee	Aurora operator in training

***b. Pilots must be qualified/certificated in the appropriate type of aircraft, i.e., rotorcraft, powered lift, fixed wing, etc.***

Not applicable

***c. Describe internal training program to qualify pilots.***

Aurora's internal program consists of a company taught ground instruction, simulator training, ground and flight operations observation, and actual flight training under the supervision of an experienced UAV operator/instructor.

***d. Describe the qualifications and training of observers.***

Observers are Aurora trained and are knowledgeable on our operations and applicable flight rules.

**7. AIRCRAFT MARKING (14 CFR Part 45). All Unmanned Aircraft System (UAS) are required to be registered and identified with the registration number. Aircraft must be marked in accordance with part 45.**

Aircraft (N827AU) markings will be IAW FAA direction received during the certification of N828AU.





**8. ATC TRANSPONDER AND ALTITUDE REPORTING SYSTEM EQUIPMENT AND USE (14 CFR § 91.215). Describe the aircraft altitude reporting system.**

There is no transponder on Aurora GoldenEye vehicles.

**9. METHOD FOR SEE AND AVOID (14 CFR 91.113a). In what manner, or by what means, will the requirement to "see and avoid" other aircraft be met? What performance will the chase plan have?**

See and avoid capability is provided by the flight crew on the ground. Currently, the vehicle is maintained in line of sight at all times. The flight crew, complemented by range safety observers, scans the operations area for potential traffic conflicts and executes appropriate avoidance maneuvers if required. Aurora does not currently use a chase plane for GoldenEye flights.

**10. SAFETY RISK MANAGEMENT. An applicant must provide a safety checklist that identifies and analyzes the hazards of UAS operations that are described in the program letter. Additional information is available by contacting the FAA Aviation Safety Inspector. A completed Safety Checklist for the GE-50 system has been submitted under separate cover to the FAA.****11. SYSTEM CONFIGURATION. Provide a description of aircraft system configuration and all on-board and ground-based equipment.**

GoldenEye-50	
On-board equipment	<ul style="list-style-type: none"><li>• Desert Aircraft DA-50 single-cylinder 2-cycle engine</li><li>• Athena Technologies flight controls computer</li><li>• 900MHz communications radio &amp; antenna</li><li>• E/O camera</li><li>• 2.4GHz video transmitter &amp; antenna</li></ul>
Ground-based equipment	<ul style="list-style-type: none"><li>• GCS laptop computer</li><li>• 900MHz radio for command &amp; control, with antenna</li><li>• 2.4GHz video receiver &amp; antenna</li><li>• Optional second display case for engineering data and/or payload video</li><li>• Strap-down platform for pre-launch run-up checks</li><li>• Starter</li><li>• Ground power / charger unit</li></ul>



**12. SYSTEM SAFETY - FLIGHT TERMINATION AND LOST LINK. What is the expectation of aircraft "Flight" if fuel is starved? Briefly describe/explain aircraft lost link and emergency recovery procedures. Provide a brief explanation of the flight termination system (FTS).**

Like most VTOL aircraft, GoldenEye aircraft do not glide. If fuel is starved, the vehicle will descend almost vertically. If the communications uplink is lost, the vehicle will hover in place and then enter a vertical auto-land. Future software loads on the GoldenEye-50 may include the ability to climb or descend to a specified altitude, turn to a specified heading, and/or return to a specified waypoint (such as the takeoff location).

The GE-50 has a "kill" command that may be issued by the flight crew. This command shuts down the aircraft's propulsion system, which will put the aircraft into a vertical descent and crash-landing.

**13. COMMAND AND CONTROL. Provide a brief description of the system and/or procedures for command and control of the UAS.**

GoldenEye-50 is operated using a touch screen laptop for command and control. The vehicle can be operated manually, in which the operator specifies direction of flight (forward, backward, left, right) and groundspeed, altitude and climb rate. Mission Scripts (plans) can also be uploaded prior to flight. These plans may include waypoint navigation, altitude changes, groundspeed changes, etc.

The vehicle is launched and recovered via one-button "takeoff" and "land" commands from the GCS. "Takeoff" directs the airplane to launch vertically and climb to a specified altitude, then hover in place until additional commands are received from the ground control station. "Land" directs the airplane to descend vertically until the ground sensors trigger, at which time the engine shuts down and the flight controls system is shutdown.

The vehicle will be operated in accordance with Aurora Report AR-07-068A, GoldenEye-50 Standard Operating Procedures, dated July 24, 2007.

**14. CONTROL STATIONS. Provide a brief description of the ground/airborne stations used to control the UAS.**

The GE50 system utilizes a computer for the ground control station. The laptop computer and the communications radios and antennas may be mounted in a vehicle or as a tabletop/handheld setup. There is also an additional computer that is sometimes used for additional data collection and system monitoring, but does not provide command and control capability.

**15. CONTROL FREQUENCIES. Provide a description/listing of the frequencies used to control the UAS.**

900 MHz (command and control)

2.4 GHz (payload video data, not used for control)



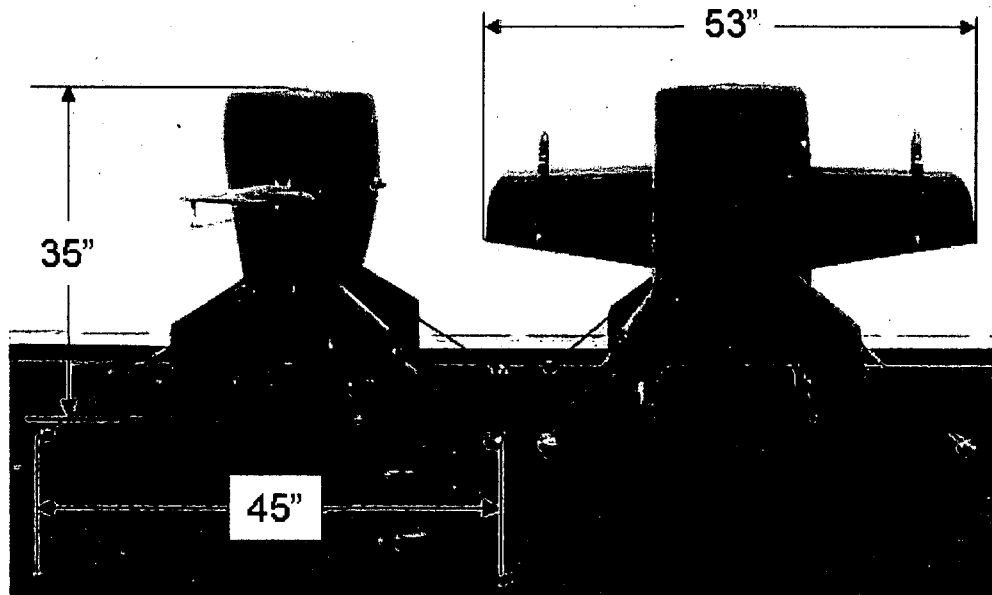


FIGURE (2) – GE-50 Side and Bottom View

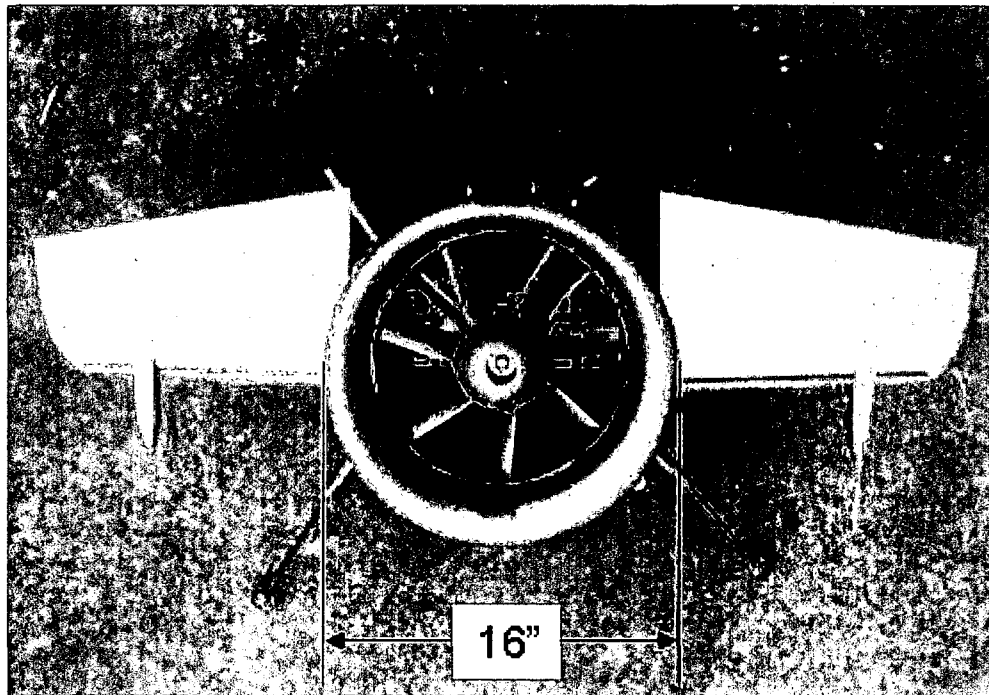


FIGURE (3) – GE-50 Front View

